# A Clinical Study
ON
# THE AVENUES OF RHEUMATIC INFECTION:

## *BASED UPON EXAMINATION OF 75 CASES OF SYDENHAM'S CHOREA.*

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This study was undertaken in order to provide some data (with a view to rational treatment and prophylaxis) concerning the extent of the relation between rheumatic infection on the one hand and infective processes in the nose and throat on the other. The data put forward in it are based upon a personal and *ad hoc* examination of 75 cases of Sydenham's chorea, taken as they came; and no case has been admitted to the series if any doubt was felt as to the diagnosis.

My particular thanks are due, and I offer them, to Dr. Morley Fletcher, from whose service for diseases of children at St. Bartholomew's Hospital most of the patients were drawn, and who has helped me in many ways; also to Dr. A. E. Gow and Dr. E. A. Cockayne, Casualty Physicians to that hospital, who have been most kind in giving me access to a number of cases.

### *The Gravity of Rheumatic Infection.*

The rheumatic affections, subacute rheumatism and chorea, constitute a graver menace to middle and later childhood than any other single disease process. Elmslie[1] has shown that more than half the deaths among children at the London County Council schools for the physically defective are due to heart disease; and it appears that some 86 per cent. of the cardiac anomalies to be met with at those schools are acquired affections.[2] Moreover, the *post-mortem* records of a children's hospital have shown[3] that more children between the ages of 8 and 15 years die from heart disease than from any other single cause, not excepting tuberculosis. It must be accepted that rheumatic infection stands to middle and later childhood in a threatening relation not unlike that of epidemic diarrhœa and tuberculosis towards the first three years of life; and this merely on the score of present fatality. Yet no one needs to be reminded how small a part of the indictment against rheumatic infection is comprehended by its present fatality; nor how many are the victims of it who survive a childhood of intermittent invalidism with no other prospect than that of a brief and crippled maturity spent under the shadow of recurring failure of the heart. It would be difficult to exaggerate the mischief brought about by this infection.

### *The Present Position.*

The extent of these depredations measures the extent of therapeutic failure; and it is a sense of the greatness of the failure which has prompted this attempt to collect some facts in order to clear the ground. For the present position of our efforts to combat rheumatic infection is unsatisfactory and anomalous. I submit that the sparring of bacteriologists as to the precise identity of the rheumatic agent has preoccupied clinicians to an undue extent. No serious person, I imagine, doubts any longer that the agent is a micro-organism of some kind; and if this be admitted, precise identification of it becomes a matter of secondary consequence. At all events, clinicians need not wait for this consummation before applying the common rule of conduct in the presence of infections—namely, to detect the avenue of infection, if possible, and by means of local treatment at the earliest moment to limit the mischief and obstruct its recurrence.

How do we stand as regards the detection of the avenue or avenues of rheumatic infection? I know of a good many physicians and surgeons who hold and teach that the tonsils are a common port of entry; the literature abounds with references to tonsillitis as a frequent manifestation of rheumatism, and with hints that in the tonsil we may have the starting-point of the infection. One might expect the treatment of the tonsil to bulk large in the advice of our authoritative writers on rheumatic affections. Yet, with the single exception of Dr. Poynton,[4] I have not met one writer in any of our leading textbooks on medicine who makes serious reference to the treatment of the pharynx. Written allusions to the importance of treating the naso-pharynx seem to be rare in medical literature generally; but of course they exist. Senator[5] has written of the etiological relation between the nose and rheumatic arthritis. Menier[6] has recorded "a case of chorea minor cured by the removal of adenoid vegetations." De Ponthière[7] speaks of "the naso-pharyngeal origin of chorea." Turner and Stewart[8] speak of hypertrophied tonsils as favouring relapse of chorea. And no doubt there are others. But it is a fact that there is no popular recognition of what so many individuals hold to be true—namely, that the infection of rheumatism gains access in a large majority of instances by way of the nose or pharynx. It seemed to me, therefore, that a collection of some facts might help to popularize this view, the acceptance of which, in my judgement, is of the greatest moment.

### *The Choice of Chorea for Investigation.*

The origin of this investigation (if I may be permitted a brief retrospect which is not without relevance) was as follows: Some years ago, while conducting a routine examination of a school of some 500 girls for the London County Council, I met with 13 examples of acquired heart disease hitherto unsuspected. When the statistics came to be tabulated it appeared that I, having at the time no theory to establish, had recommended no fewer than 10 of the 13 for operative treatment on account of nasal obstruction or tonsillar hypertrophy. My attention was naturally engaged by the circumstance, and I set about collecting data concerning the relation of rheumatic affections to nasal and pharyngeal anomalies. But here arose the difficulty that, owing to the vagueness of articular manifestations in the rheumatism of childhood, it was frequently difficult to feel confident of the diagnosis. Moreover, even if the relation were as close as seemed likely to be the case, there was little hope of establishing the thing as a fact unless it were possible to examine a series of patients within a short interval from the beginning of symptoms; for manifestations seemingly so trivial as nasal catarrh and sore throat do not live long in the recollection, particularly of parents of the hospital class. This early examination proved to be unattainable, since the invasion of juvenile rheumatism is commonly so insidious that it is usual for weeks, and often months, to have elapsed between the commencement of symptoms and the bringing of the patient for treatment. I therefore turned to chorea as being a symptom more easily diagnosed with confidence, and one which might be expected to bring the patient before the doctor while the lesion giving entry to the infection was still in progress, or at all events in time to secure a record of such catarrhal or inflammatory antecedents as might have heralded the appearance of movements.

### *Relations of Chorea and Rheumatism.*

It may be objected that Sydenham's chorea has not been proved to be a rheumatic manifestation. Undoubtedly, until the bacteriology of the two affections has been established demonstration must be lacking. But I think the circumstantial evidence no longer admits of reasonable doubt that the two are but different signals of one disease process. Every one admits that the relation is a close one, and some[9] have long since declared for the unity of them. I myself had doubts before this inquiry, but they have been dissipated completely by the following considerations.

I.

The proportion of choreic children exhibiting, or having in the past exhibited, articular manifestations is put by various authors at figures ranging from 26 per cent. to 56 per cent.[10] This high proportion, whichever extreme be taken, seems to admit of two solutions only. Either the diseases depend upon the same infection, or they depend upon two infections which, though distinct, are yet mutually favourable each to the other. Now, if the two were essentially independent, one would expect to see with great frequency pure cases of chorea free from borrowed rheumatic symptoms. As a fact, if inquiry be made, it is

relatively exceptional to meet cases of chorea lacking a well-defined history of pains in the limbs or joints. In the present series the results were as follows:

| | | |
|---|---|---|
| Reliable information in 67 cases. | | |
| History of rheumatic fever or pains ... | 71.5 | per cent. |
| Doubtful history of pains ... ... | 7.4 | ,, |
| No pains... ... ... ... ... | 20.8 | ,, |

Dr. M. Fraser's series of 300 cases at the Children's Hospital, Paddington Green,[11] is not dissimilar in effect.

| | | |
|---|---|---|
| Previous joint rheumatism ... ... ... | 50 | per cent. |
| Concurrent rheumatic fever or heart murmur | 27 | ,, |
| Total ... ... ... ... | 77 | ,, |

Therefore, unless it be assumed that heart affections and pains in the limbs or joints are regular symptoms of pure chorea, or that chorea and rheumatism, though independent diseases, are yet incapable of appearing apart in more than from 20 to 30 per cent. of instances, one must conclude that the two are but varied manifestations of the same disorder. And of these three hypotheses the last is certainly the easiest to accommodate.

II.

If rheumatism and chorea be due to the same infection one might expect them to manifest the same seasonal characteristics. As a matter of fact, their seasonal prevalence is not identical. The data available for estimating the monthly incidence of chorea in this country are limited, I believe, to the charts given by Dr. Morley Fletcher, which relate to 574 cases only. Although these figures have not sufficed to produce an even curve, they show the tendency of chorea to become prevalent somewhat later in the year than does rheumatic fever. (See Chart.)

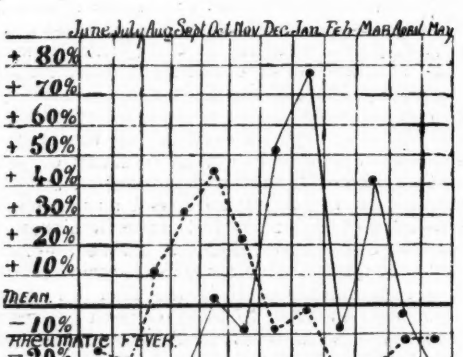


Chart of monthly incidence of rheumatic fever and chorea in London, expressed in percentage of mean monthly value. Dated from onset of symptoms. ——— Chorea; 574 cases, adapted from Morley Fletcher, *St. Bartholomew's Hospital Reports*, vol. xxxii, p. 388. ..... Rheumatic fever; 1,928 cases, adapted from Phillips, Allbutt's *System of Medicine*, vol. ii, part i, p. 600.

This discrepancy is susceptible of a simple and adequate explanation. Those who have examined carefully a number of cases of chorea will agree that there are commonly, if not always, two stages in the development of choreic movement. The first is a stage of potential (or, as Dr. Miller calls it, latent) chorea; the second the stage of frank movement. This prechoreic phase may endure for many weeks. It is marked by emotional irritability and fretfulness always; sometimes by obvious change in disposition; often by headaches and intellectual dullness; and is a pronounced and constant feature when it is looked for. It must be regarded as the index of some subtle factor at work upon the central nervous system. Given a nervous system thus disequilibrated the moment of emergence of choreic movements becomes a matter partly of temperament, partly of chance; or, rather, a matter of the interaction between temperament and chance. For in such circumstances the most trifling emotional stress assumes a power of disturbance out of all proportion with its rights, and the more temperamentally unstable the child the lower is the limit of psychical stimulation competent to convert potential into active chorea. It is legitimate to speak in this dogmatic fashion, for the evidence that psychical shock is an exciting cause of choreic movements is altogether too strong to be overlooked or credited to coincidence. Making allowances for the forgetfulness of the youthful patients and for the transiency (as far as overt manifestations go) of emotional outbreaks in early life, be they never so violent while they last, and making allowances also for the necessarily partial knowledge of parents in this particular, it is surprising how often a plausible story of precedent shock or abnormal excitement is forthcoming. In this series it was obtained in 41 per cent. of the cases offering reliable information on the subject. Further, the reality of this psychical relation is confirmed by the efficacy of isolation in abating the movements of choreic children who have failed to respond to mere rest in bed.

If it be admitted that emotion can, and does frequently, act as an exciting cause of choreic movement, we arrive at the following intelligible, and I think satisfying, conception of chorea. Just as the poison alcohol, or the tubercle bacillus, acts upon different susceptible individuals in different ways, attacking this tissue in one subject and that in another, so does the rheumatic infection exercise a selective action upon the tissues of those susceptible to it, venting itself mainly or wholly upon arthritic structures sometimes, sometimes upon fibrotendinous tissues predominantly, sometimes upon the nervous system or parts of it. The subtle factor mentioned above as being responsible for the cerebral manifestations of the pre-choreic period is the infection of rheumatism (or its diffusible poison, as seems to me more likely) acting upon a specifically predisposed nervous system. It is only when the nervous system has been thus suitably prepared that the emergence of choreic movements becomes possible. Whether they will appear at all, and, if so, the moment of their appearance, are matters to be resolved by the chance incidence or absence of emotional stresses.

If the existence of a pre-choreic period be admitted—a period, that is to say, during which the rheumatic poison is slowly undermining the stability of the central nervous system—then the postponed prevalence of chorea as opposed to rheumatism becomes a witness for, rather than against, the essential unity of the two.

III.

The frequent occurrence of rheumatism and chorea in the same individual at the same time; their frequent appearance in the same individual at different times; their mutual interchangeability among the various members of a rheumatic or choreic stock; their common liability to be complicated by heart affections of identical and unique character—all these clinical commonplaces combine to supply a weight of circumstantial evidence for unity which is almost irresistible.

*Pathology of Chorea.*

The study of the material at my disposal has left me as completely convinced as anything short of actual demonstration can do that chorea is nothing more than a symptom led up to by the action of the rheumatic poison upon nervous tissues of an emotional, that is to say feminine, type. This conception agrees well with all the facts known to me concerning chorea, with one possible exception: I mean the undoubted fact that chorea is of more frequent occurrence among the poorer classes than among the well-to-do—a circumstance at first sight contrary to expectation. Yet it does not, I think, vitiate the conception. For the minor degrees of loss of health which are comprehended by the prechoreic phase, though they may fail to attract the attention of a hard-worked mother in the labouring class will not pass unnoticed in the case of children more favourably situated; with the result that whereas the prechoreic child of poor parents continues to be exposed daily to the efficient determining causes of choreic movement, the other is daily sheltered from them, and thus escapes more often than her poorer sister the final term in the series they have so far shared.

I think I cannot do better than conclude this section of the subject by citing a most suggestive history as regards this issue.

A man who has had rheumatic fever himself on three occasions has two daughters, aged 8 and 12 years respectively. The younger exhibits well-marked chorea and complains of pains

in the limbs, but is free from lesions of the heart. The elder complains of generalized articular pain and stiff neck, and has organic valvular disease of the heart, but is free from movements. Their history is as follows: Three months ago the younger girl developed a bad sore throat (severe enough to lead to the fear that it meant diphtheria), and movements one week later. She is described as very excitable, and is said to have had rheumatic fever at 3 years of age and chorea at 6. Two weeks after the onset of sore throat in the younger child the elder was similarly affected, and within a few days was attacked by articular pains and general stiffness but remained free from movements. This girl is described as being much less excitable than her sister. She has had two previous attacks of rheumatism, in her sixth and seventh years, but has never suffered from chorea.

On all these grounds I submit that the unity, as regards identity of the infection, of chorea and rheumatism is established beyond reasonable doubt, and that the following data concerning the naso-pharyngeal history and condition, though drawn from choreic patients, are applicable to the rheumatic infection generally, at all events during childhood.

*General Considerations Relative to Paths of Infection.*

Although it is probably true that an infecting agent can, on occasion, traverse an intact mucous membrane and subsequently excite a constitutional infection, it is nevertheless certain that in a vast majority of instances a local inflammation or breach of surface is a necessary intermediary. Sometimes the local lesion is pronounced, as happens with measles and scarlet fever; sometimes it is apparently trivial, as may happen with pyogenic infections and syphilis. But it exists wellnigh always. Now when we find, in the case of a common infective malady, that an immense amount of clinical observation has left the path of infection still obscure, we may be pretty certain either that the portal is some unobservable portion of the alimentary canal, or that entry occurs elsewhere under cover of some frequent and intrinsically insignificant phenomenon which has masked the more important mischief-maker. This statement has been proved to be true of malaria and the insect-borne diseases generally, and probably has a wide application. Under the circumstances which exist in this country, therefore, we are entitled *a priori* to suspect that the rheumatic infection gains an entry under cover of some common lesion of a mucous surface, and experience tells us that a sore throat is a frequent precursor of rheumatic fever. So both reason and observation make out a *prima facie* case in favour of the main thesis I am urging.

*Naso-pharyngeal Data.*

A. Of the 75 children, 21.2 per cent. had already been operated upon, at some time prior to the current attack of chorea, for the relief of "tonsils and adenoids." I am unable to say what proportion of ordinary school children of corresponding age and sex and class have undergone this operation. The medical officer to the Board of Education has stated, on the basis of five million examinations, that 8 per cent. of school children require it.[12] While I am confident that this is far too low an estimate, for London at least, and do not feel disposed to press the significance of this considerable proportion of previous operations among choreic children, I think the fact may be taken as unbiassed evidence that naso-pharyngeal anomalies of a pronounced kind are common among them. This evidence gains weight when one reflects how many children of this class escape operative treatment through the carelessness of their parents, however urgent be the call for it; and that if the operation has actually been performed in 21.2 per cent. of the cases one may look to find lesions calling for operation in a much larger proportion.

B. As regards nasal and pharyngeal inflammations of consequence, the following items were accepted as evidence:

1. Enlargement of the tonsils or tonsillar lymphatic glands in the neck.
2. Obvious mouth-breathing.
3. Excoriation of the nostrils, or pus in the nasal passages.

One or other of these manifestations existed in 88 per cent. of the cases, and often several of them together.

There is no standard available for strict comparison with this finding. Macleod Yearsley found,[13] as a result of 1,246 examinations, that enlarged tonsils or adenoids were present in 42.9 per cent. of school children, and this is the highest estimate I have met with.

The details making up the 88 per cent. are as follows:

| | | |
|---|---|---|
| 1. Tonsils enlarged, including those previously operated upon | ... ... | 62 per cent. |
| 2. Tonsillar glands enlarged | ... ... | 65 ,, |
| 3. Existing inflammation of nasal passages (53 cases)— | | |
| (*a*) Soreness or excoriation of anterior nares | ... ... | 11 |
| (*b*) Pus in anterior nares | ... ... | 10 |
| (*c*) Muco-pus streaming from naso-pharynx | ... ... | 6 |
| Total | ... ... | 50 per cent. |

I submit that on this evidence one is entitled to say that the active phase of the rheumatic infection is fairly consistently attended by inflammatory lesions about the naso-pharynx, whether there be a causal relationship between the two or not.

Inquiries as to this relationship yielded the following results.

A satisfactory antecedent history was forthcoming with respect to 52 attacks, 46 belonging properly to this series and 6 being previous attacks sustained by members of the series. Among these 52 there was a definite history of a closely precedent acute lesion of the nose or throat in 39, or 75 per cent. The details are as follows:

| | | | |
|---|---|---|---|
| Closely precedent sore throat | ... ... ... | ... | 16 |
| ,, ,, | sore nose or nasal catarrh | ... | 12 |
| ,, ,, | operation on tonsils | ... ... | 2 |
| ,, ,, | scarlet fever | before this attack 1 | |
| | | before previous attacks ... 5 | 6 |
| ,, ,, | diphtheria | before this attack 1 | |
| | | before previous attacks ... 1 | 2 |
| ,, ,, | measles ... ... ... | ... ... | 1 |

It appears, therefore, that in a high proportion of instances with regard to which information is forthcoming, inquiry will elicit a history of closely precedent nasal or pharyngeal inflammation, sore throat being the commonest lesion, with some acute nasal affection as a good second.

*Some Incidental Matters of Importance.*

*Firstly*, it has been a frequent experience in the course of the collection of these data to find a blank denial given to the question as to precedent throat trouble, and yet to find on examination tonsils sometimes of enormous size. This suggests that historical evidence underestimates heavily the frequency of precedent throat affections sufficient in themselves to account for the entry of an infection by way of the tonsils, and also that the tonsillar inflammations productive of chronic hypertrophy are not necessarily painful to any great degree.

*Secondly*, excoriation of the anterior nares, often attended by scab formation on the inner aspect of them, is a fairly common event in chorea. My attention was not attracted to it until the series had advanced some distance, but when it was looked for it was found with tolerable frequency. Straton,[14] in 1885, called attention to this conjunction, but I have found no later mention of it. He says that chorea in early life is characterized first by sores in the nostril or pharynx, malaise, blunted intellect, vague pains and swellings of the joints, some degree of paresis, and finally, disorderly movement. He instances three children attending the same school. One little girl had a sore nose, became stupid, developed a cardiac murmur and tender metatarsal joints, and finally chorea. Shortly afterwards another little girl exhibited precisely the same course of symptoms, ending in chorea. Presently the brother of the second child developed a sore nose, with a fissure at the anterior margin of the nares, and became more stupid than his sister, but never exhibited any movements. The choreic sequence, that is to say, was arrested in his case in the prechoreic phase. I believe this lesion is an important and not uncommon one, and has a definite relation to the entry of the rheumatic infection.

*Thirdly.* Authorities upon scarlet fever hold that chorea is a very rare sequel of this affection. Caiger[15] does not mention it. Priestley[16] puts the figure at 0.2 per cent., which gives a frequency for chorea among scarlet fever patients less, according to Osler,[17] than that observed among patients at a general hospital. The matter is vital to my argument; for if it be the fact that chorea seldom follows scarlet fever, while rheumatism is known to do so

with moderate frequency, the fact would be almost conclusive evidence against the essential unity of chorea and rheumatism. In the present series only one of the current attacks could be brought into relation with immediately precedent scarlet fever. But there were five others, recurrent attacks, with regard to which it was convincingly stated that the first or (in one case) second bouts of chorea had followed close in the wake of scarlet fever. Fourteen of the 75 children had suffered from scarlet fever, and of them no less than 6 had developed chorea shortly after their return from the fever hospital. The discrepancy between these figures and those of the fever hospitals is explained by a consideration of the history of the only attack in the series which was closely associated with scarlet fever. The child returned from the fever hospital and was kept at home for three weeks, during which she exhibited no movements. She was then sent back to school, and the very next day was observed to be jerking herself about. It seems clear that the ordered placidity of a fever hospital exercised in her case, and presumably in the others, a sedative influence upon a nervous system already in a state of potential chorea, and that the withdrawal of this steadying influence combined with exposure to the chances of everyday life admitted the determining factor, emotional stress, which in the case of the child under discussion was provided by her first visit to school since her illness. There is no other assumption than this which will account for the otherwise singular fact that chorea should be actually rarer in a fever hospital than among the common run of hospital patients; but the fact chimes well with the conception of chorea given above.

*Fourthly.* It is quite certain that amputation of the tonsils is ineffectual for any other purpose than the removal of a physical obstruction in the airway. The tonsillar remains or tonsillar lymphatic glands were still enlarged in all but 3 of the 16 children previously operated upon, and of those 3, 1 had been treated by enucleation.

### CONCLUSIONS.

1. That Sydenham's chorea and rheumatic fever are due to one and the same infecting agent.

2. That the action of the rheumatic poison upon a specifically predisposed central nervous system produces a characteristic nervous instability which may precede the appearance of choreic movements by some weeks, and may in other cases itself constitute the sole evidence of the choreic tendency, the phase of movements never becoming developed at all.

3. That the emergence of choreic movements is determined by emotional stimuli acting upon a central nervous system thus previously disequilibrated.

4. That the commonest avenue of rheumatic infection is the tonsil, and next to it the nose.

5. That the first essential of rational treatment of rheumatic infection is restoration of the upper air passages to a healthy condition,

6. That irrigation and thorough cleansing of the nasal passages, combined with antiseptic treatment of the nose and pharynx, should be a routine item of antirheumatic treatment; and that the operation of enucleation should be performed without delay upon all rheumatic children who exhibit chronic enlargement of the tonsils or of the tonsillar lymphatic glands.

7. That chorea is a common sequel of scarlet fever, but that the appearance of movements is usually postponed until the patient has left the fever hospital.

### STATISTICAL TABLE.

| | | |
|---|---|---|
| Total number of cases | | 75 |
| Proportion of girls to boys | | 5.25 to 1 |
| Average age | | 10 years |
| Family history of rheumatic fever or chorea (67 cases)— | | |
| Father and mother | 6 | |
| Father, not mother | 9 | |
| Mother, not father | 8 | |
| Total parental | | 23 (34.3%) |
| Brother, sister, uncle or aunt | 15 | |
| Total with positive family history | | 38 (56.7%) |
| Colour of hair (59 cases)— | | |
| Red or rufous | 15 | |
| Not red or rufous | 27 | |
| Total fair | — | 42 |
| Brown | | 8 |
| Dark | | 9 |
| Immediately precedent shock (51 cases)— | | |
| Plausible history present in | | 41 % |
| Condition of heart (75 cases)— | | |
| Normal in | | 30 (40%) |
| Organic disease in | | 25 (33.3%) |
| Doubtful murmurs in | | 20 (26.6%) |
| Relation to scarlet fever (67 cases)— | | |
| No previous scarlet fever | | 53 |
| Previous scarlet fever | | 14 |
| No chorea or rheumatism as direct sequel | | 6 |
| Chorea as direct sequel | | 6 |
| Rheumatism as direct sequel | | 2 |
| Enlarged movable lymphatic glands along lower border of mandible, unexplained by condition of teeth or gums, in | | 4 |
| Present condition with regard to tonsils and tonsillar glands of 15 cases previously operated upon by amputation— | | |
| Tonsillar glands enlarged | | 13 |
| Remnants of tonsil enlarged | | 7 |
| Tonsillar region healthy | | 2 |

*Table showing Age at Onset of First Attack of Chorea (70 Cases).*

First attack occurred at—

| | | | |
|---|---|---|---|
| 4 years of age in | 2 cases. | 11 years of age in | 6 cases. |
| 5 " " | 4 " | 12 " " | 6 " |
| 6 " " | 9 " | 13 " " | 3 " |
| 7 " " | 12 " | 14 " " | 2 " |
| 8 " " | 9 " | 15 " " | 1 case |
| 9 " " | 9 " | 16 " " | 1 " |
| 10 " " | 6 " | | |

*Table of Recurrences (73 Cases).*

| | | |
|---|---|---|
| The current attack was the first in | | 33 cases. |
| " " second in | | 21 " |
| " " third in | | 11 " |
| " " fourth in | | 3 " |
| " " fifth in | | 5 " |

Percentage of recurrences = 54.7.

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## A POSSIBLE TEST IN THE DIFFERENTIATION BETWEEN HUMAN AND BOVINE TYPES OF THE TUBERCLE BACILLUS.


BY

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**THE most reliable test which we possess in the process of differentiation between human and bovine tubercle bacilli is the inoculation of certain animals (most commonly the rabbit or the calf) with a small known quantity* of the organism under investigation. If the infection results in a rapid dissemination of the disease and the speedy death of the animal, it may be affirmed that the bovine bacillus in the organism present.**

* The exact amount varies in the case of the rabbit; 0.01 mg. of the dried bacilli is the most suitable quantity (Royal Commission Reports).

If, on the other hand, the resulting lesions are few and tending to be retrogressive, and death ensues after a very considerable interval of time, or from some intercurrent disease, the infection may be classified as human.

The inoculation is made intravenously, and the dissemination of the disease is a general one. When the inoculation is made locally, there results a localized development of tubercle, and the degree of local reaction varies according to whether the human or the bovine bacillus has been the causative factor.

A distinction can be drawn between human and bovine bacilli by the local reaction, as well as by the general reaction produced in these animals.

The difficulty lies in appreciating the degree of local reaction. In subcutaneous or intramuscular injection finer distinctions are impossible. It is necessary to make use of some structure in which the changes are distinct and definite. I have found that the ideal situation in which to demonstrate such is the synovial membrane, and more especially the synovial membrane of the knee-joint of the rabbit.

By the degree of reaction, clinical and pathological, consequent upon inoculation of the joint with a small quantity of bacillary emulsion one can differentiate between the human and the bovine types of tubercle bacilli.

*Technique.*

Rabbits were employed in the various experiments. The test is best demonstrated when an emulsion of the bacilli is injected into the part, but it may be carried out with pus or other pathogenic fluid; it is essential, however, that no mixed infection be present.

I have chosen the knee-joint as being the most convenient and accessible. Admission to the interior of the joint is gained by strongly flexing the joint and inserting the needle by the side of the ligamentum patellae.

It is not necessary to weigh out any exact amount. I make up a thin emulsion, and inject 1 c.cm. It is difficult to define the standard of the emulsion, but it is usually of such a density that one can read through it the leader type of a newspaper.

The sequelae are distinct. If the human bacillus is introduced, there are few resulting changes; the synovial membrane becomes slightly thickened, and there is some excess of fluid in the joint—there is no degree of stiffness and no joint pain; the animal continues to put on weight or remains constant.

If the joint is examined three or four months later, there is found to be a chronic synovial tubercle. It is rare to find any degree of disease in the bones or articular cartilages or throughout the body.

When, on the other hand, the bovine bacillus is injected, the changes are rapid and acute. About ten days after inoculation the animal becomes cripple, the joint becomes swollen and painful, the limb takes up a permanently flexed position; there is a progressive and continuous loss of weight. Examination of the joint three to four weeks after inoculation shows the presence of acute synovial tubercle; the interior of the joint is full of caseous débris, the articular cartilages are eroded; there are foci in the neighbouring bones and throughout the body; the lungs, spleen, and kidneys are diseased. Nothing could be more striking than the distinction clinically and pathologically.

In the following table the results of fifteen applications of the test will be found. In twelve of these, strains of bacilli isolated from bone and joint tuberculosis were employed. These strains had been fully investigated by me, and the details will be found in a paper published in the current volume of the *Journal of Experimental Medicine*. In the remaining three cases pus from clinically tuberculous lesions was employed.

*Summary of Experiments.*

| No. | Animal. | Date of Inoculation. | Date of Examination. | Clinical Condition. | *Post-mortem* Examination. | Result. | Control Experiment. |
|---|---|---|---|---|---|---|---|
| 1 | Rabbit; weight 2,100 grams | February 10th | May 15th; 3 months later | Some thickening of joints; no limping or pain | Chronic synovial tubercle | Human | Human. |
| 2 | Rabbit; weight 1,890 grams | February 10th | May 20th; 3 months later | Thickening of joint; no pain | Chronic synovial tubercle | Human | Human. |
| 3 | Rabbit; weight 2,000 grams | February 10th | June 10th; 4 months later | Slight hydrops of infected joint | Chronic synovial tubercle | Human | Human. |
| 4 | Rabbit; weight 1,980 grams | February 14th | March 11th; 1 month later | Joint swollen, painful; animal cripple | Acute tubercle: joint full of caseous débris | Bovine | Bovine. |
| 5 | Rabbit; weight 1,750 grams | February 15th | February 25th; 10 days later | Joint distended with fluid; animal cripple | Acute synovial tubercle; joint full of caseous débris; general tuberculosis | Bovine | Bovine. |
| 6 | Rabbit; weight 1,800 grams | February 15th | March 8th; 21 days later | Joint distended; knee flexed and painful; losing weight | Acute synovial tubercle; caseous material in joint; general tuberculosis | Bovine | Bovine. |
| 7 | Rabbit; weight 2,100 grams | February 18th | March 10th; 20 days later | Acute change in joint; losing weight | Acute synovial tubercle; tubercle in lung and spleen | Bovine | Bovine. |
| 8 | Rabbit; weight 1,900 grams | March 8th | August 8th; 5 months later | No change beyond slight synovial thickening | Chronic synovial tubercle; no general tuberculosis | Human | Human. |
| 9 | Rabbit; weight 2,200 grams | March 8th | July; 4 months later | No change beyond synovial thickening | Chronic synovial tubercle; no general tuberculosis | Human | Human. |
| 10 | Rabbit; weight 1,980 grams | April 8th | April 20th; 12 days later | Evidence of acute arthritis; joint flexed | Acute synovial tubercle | Bovine | Bovine. |
| 11 | Rabbit; weight 2,100 grams | April 9th | April 19th; 10 days later | Evidence of acute arthritis; animal cripple; losing weight | Acute synovial tubercle | Bovine | Bovine. |
| 12 | Rabbit; weight 2,000 grams | May 3rd | May 26th; 23 days later | Evidence of acute arthritis; animal cripple and losing weight | Acute synovial ubercle; joint full of caseous débris; losing weight | Bovine | Bovine. |
| 13 | Rabbit; weight 2,100 grams | May 3rd | May 26th; 23 days later | Evidence of acute arthritis; cripple and losing weight | Acute synovial tubercle; caseous débris in joint; losing weight | Bovine | Bovine. |
| 14 | Rabbit; weight 2,000 grams | May 3rd | | Thickening of joint; no evidence of acute change; weight constant | | Human | Human. |
| 15 | Rabbit; weight 1,970 grams | April 9th | May 9th; 1 month later | Evidence of acute arthritis; losing weight | Acute synovial tubercle; general tuberculosis | Bovine | Bovine. |

The control experiment quoted above was the intravenous inoculation of the rabbit with 0.01 mg. of the culture.

*Advantages of the Test.*

1. It may be applied equally readily with bacillary emulsion, with pus or other pathogenic fluid.*
2. The distinctions in the degrees of reaction produced in the joint are absolute.
3. The result of the test is apparent in a comparatively short time; if no acute signs are present three weeks after inoculation the test may be taken as indicating a human infection, and vice versa.
4. The test is specially recommended by its simplicity.

*Conclusions.*

(*a*) Just as the general reaction of the rabbit to infection by the human or bovine bacillus varies greatly in degree, so does the local reaction.

(*b*) The best situation in which to demonstrate such a local reaction is the synovial membrane of the knee-joint.

(*c*) Infection of the knee-joint of the rabbit with a bovine bacillus produces an intense reaction with acute synovial tuberculosis; infection with the human bacillus results in a chronic synovial thickening.

(*d*) The test is of value as quickly distinguishing between the human and bovine types of the tubercle bacillus.

I have to acknowledge my indebtedness to Dr. James Ritchie, Director of the College of Physicians' Laboratory, Edinburgh, for his guidance and advice; also to the trustees of the McCunn Research Trust and the Carnegie Trust for defraying the expenses of the research.

* The fluid is centrifuged and an emulsion of the deposit injected.

## THE SOIL AND THE SEED IN TUBERCULOSIS.

BY

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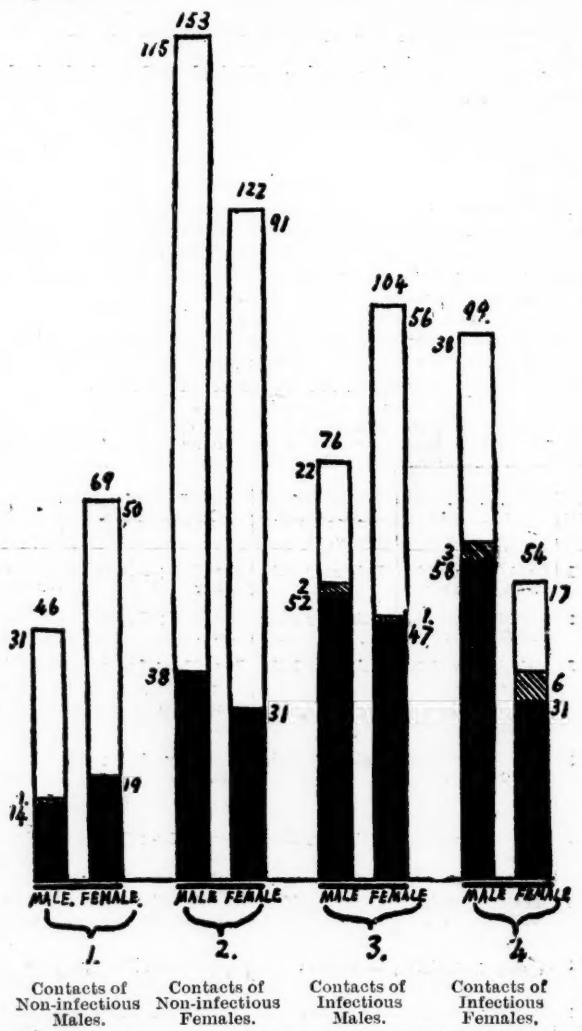
THE battle of the soil and the seed—*hérédité du terrain ou hérédité du grain*—has been waged for a century around tuberculosis. If one accepts congenital tuberculosis as a possible but infrequent occurrence, the issue is then centred upon the existence or non-existence of a direct transmitted predisposition to the disease. Those physical signs regarded as evidence of a tuberculous diathesis in childhood are too well known to require recollection, and have generally been ascribed to a transmitted weakness of tissue as the result of tuberculosis in the parents. To D. J. Hamilton[2] the physical signs of this predisposition were so well marked that he held it to be a true inherited strain of a variation which took place far back in the history of the race. Others have suggested that these physical signs, so far from connoting an inherited predisposition, are the expression of the actual infection of the child after birth. Some years ago, believing in an inherited predisposition, I attempted to controvert this suggestion by a collation of all the myths that had haloed round that blessed word "diathesis."[1]

The practice of a tuberculosis dispensary demonstrated to me that which was first proved by R. W. Philip—that childhood is the age at which tuberculous infection is most frequent. If we admit the frequency of tuberculous infection in childhood, it is certain that the actual presence of so profound a neuro-muscular toxin as the tuberculous toxin will exercise a more powerful influence on the metabolism of the child than the influence of a far-off inherited strain. It is not from that standpoint that the question is approached in this paper, but from a consideration of the amount of tuberculous infection among a "contact" population in relation to the absence or presence of the tubercle bacillus in the expectoration of the original patients.

A diagnosis of early pulmonary tuberculosis is made when the following signs are present: Philip's small glands above the clavicle, diminished tidal expansion on the affected side, rapid tailing off of the resonant area above the clavicle, relative dullness, alteration—usually a weakening—of the inspiratory murmur on the affected side, *plus* the presence of a positive tuberculin reaction.

From the dispensary during the year ending December, 31st, 1911, the "contacts" (persons living in the same household) of 204 cases of pulmonary tuberculosis were examined. A total of 723 contacts were examined, of whom 420 were found to be healthy, 290 infected with tuberculosis of the lung, and 13 with other forms of the disease. In all 41.9 per cent. of contacts were infected. Of the original patients, some were infectious, having tubercle bacilli in the sputum, while others were non-infectious at the time, since no tubercle bacilli were found. The amount of infection in the contacts showed a marked relationship to exposure to infection. In the families of those in an infectious stage of the disease, the majority (60 per cent.) were infected with tuberculosis. In the families of non-infectious patients, the majority (75.5 per cent.) were healthy. The actual figures are given in the accompanying tables (p. 1435), the original cases being divided into four groups—non-infectious males, non-infectious females, infectious males, and infectious females.

The results are shown graphically in the following diagram:




White portion of columns = actual number found to be healthy.
Shaded portion of columns = actual number found to have tuberculosis.
Black portion of columns = actual number found to have pulmonary tuberculosis.

If we combine certain of these age groups, the amount of infection at different periods of life in relation to exposure or non-exposure to immediate human infection appears as follows:

*In Children under the Age of 15 Years.*

211 were in relation to non-infectious patients, and 92, or 43.6 per cent., were infected.

161 were in relation to infectious patients, and 120, or 74.5 per cent., were infected.

*In Adults between the Ages of 15 and 25 Years.*

41 were in relation to non-infectious patients, and 5, or 12.1 per cent, were infected.

63 were in relation to infectious patients, and 42, or 66.6 per cent., were infected.

TABLE I.

| Type of Original Case. | Number of Cases. | Number of Contacts. | | Number Healthy. | | Number found to have Pulmonary Tuberculosis. | | Number found Non-Tuberculous. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Males. | Females. | Males. | Females. | Males. | Females. | Males. | Females. |
| NON-INFECTIOUS MALES (No tubercle bacilli found)... | 32 | 46 | 69 | 31 (67.4 %) | 50 (72.4 %) | 14 (30.4 %) | 19 (27.5 %) | 1 (2.1 %) | — |
| Total ... ... ... ... ... ... ... | | 115 | | 81 | | 33 | | 1 | |
| NON-INFECTIOUS FEMALES (No tubercle bacilli found) | 69 | 153 | 122 | 115 (75.1 %) | 91 (74.5 %) | 38 (24.8 %) | 31 (25.4 %) | — | — |
| Total ... ... ... ... ... ... ... | | 275 | | 206 | | 69 | | | |
| INFECTIOUS MALES (Tubercle bacilli found) ... ... | 55 | 76 | 104 | 22 (28.9 %) | 56 (53.8 %) | 52 (68.4 %) | 47 (45.2 %) | 2 (2.6 %) | 1 (0.9 %) |
| Total ... ... ... ... ... ... ... | | 180 | | 78 | | 99 | | 3 | |
| INFECTIOUS FEMALES (Tubercle bacilli found)... ... | 48 | 99 | 54 | 38 (38.3 %) | 17 (31.4 %) | 58 (58.5 %) | 31 (57.4 %) | 3 (3.0 %) | 6 (11.1 %) |
| Total ... ... ... ... ... ... ... | | 153 | | 55 | | 89 | | 9 | |
| ALL TYPES ... ... ... ... ... ... ... ... | 204 | 367 | 256 | 106 (28.9 %) | 214 (83.6 %) | 162 (44.1 %) | 128 (50.0 %) | 6 (1.6 %) | 7 (2.7 %) |
| Total ... ... ... ... ... ... ... | | 723 | | 420 | | 290 | | 13 | |

*In Adults over the Age of 25 Years.*

138 were in relation to non-infectious patients, and 6, or 4.3 per cent., were infected.

109 were in relation to infectious patients, and 38, or 34.8 per cent., were infected.

From these figures it would appear that childhood is the age at which tuberculous infection of the lung is most frequent, and that where children are exposed to contagion from their parents the amount of infection is almost double that which exists in children of patients in a non-infectious stage of the disease. Between the ages of 15 and 25 the amount of infection is five times greater in those exposed to immediate human infection than among those not so exposed. Over the age of 25 there is very little tuberculous infection, except in relation to patients in an infectious stage of the disease. Again, while the child is most vulnerable, the danger of exposure to infection diminishes as life advances.

Why 43.6 per cent. of the children of non-infectious consumptives should show signs of tuberculous infection,

TABLE II.—*Showing the Age and Sex Constitution, and Amount of Infection among a Contact Population.*

| Age Groups. | Contacts of Non-infectious Males. | | | | | | Contacts of Non-infectious Females. | | | | | | Contacts of Infectious Males. | | | | | | Contacts of Infectious Females. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Males. | | | Females. | | | Males. | | | Females. | | | Males. | | | Females. | | | Males. | | | Females. | | |
| | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. | Healthy. | Pulmonary Tuberculosis. | Tuberculosis. |
| 0-5 ... ... ... | 6 | 5 | 1 | 10 | 2 | | 17 | 10 | | 14 | 4 | | 7 | 8 | 1 | 8 | 2 | 1 | 3 | 6 | 3 | 4 | 6 | 4 |
| 5-10 ... ... ... | 4 | 7 | | 4 | 9 | | 15 | 15 | | 14 | 15 | | 3 | 14 | 1 | 2 | 12 | | 3 | 14 | | 1 | 13 | 2 |
| 10-15 ... ... ... | 4 | 1 | | 4 | 4 | | 9 | 10 | | 18 | 9 | | 1 | 11 | | 3 | 5 | | 2 | 10 | | 4 | 7 | |
| 15-20 ... ... ... | 3 | 1 | | 1 | 1 | | 7 | 1 | | 6 | 2 | | 4 | 6 | | 5 | 8 | | 3 | 8 | | 1 | 4 | |
| 20-25 ... ... ... | | | | 3 | | | 7 | | | 9 | | | 2 | 5 | | 2 | 6 | | 3 | 4 | | 1 | 1 | |
| 25-30 ... ... ... | 1 | | | 6 | | | 1 | 1 | | 2 | | | 1 | 3 | | 3 | 2 | | 2 | 2 | | 1 | | |
| 30-35 ... ... ... | 1 | | | 8 | | | 18 | | | 7 | 1 | | 1 | 2 | | 4 | 5 | | 2 | 4 | | | | |
| 35-40 ... ... ... | 4 | | | 6 | 2 | | 16 | | | 6 | | | | | | 6 | 3 | | 5 | 4 | | | | |
| 40-45 ... ... ... | 3 | | | 3 | | | 11 | | | 7 | | | 2 | 3 | | 9 | 2 | | 4 | 4 | | 1 | | |
| 45-50 ... ... ... | 1 | | | | | | 7 | 1 | | 5 | | | | | | 4 | | | 4 | 1 | | 3 | | |
| 50-55 ... ... ... | 2 | | | 1 | 1 | | 3 | | | 1 | | | | | | 3 | 1 | | 3 | 1 | | 1 | | |
| 55-60 ... ... ... | | | | 1 | | | 2 | | | 1 | | | | | | 1 | 1 | | 2 | | | | | |
| 60-65 ... ... ... | 1 | | | 1 | | | 2 | | | 1 | | | | | | 6 | | | 2 | | | | | |
| 65 + ... ... ... | 1 | | | 2 | | | | | | | | | 1 | | | | | | | | | | | |
| Totals ... ... | 31 | 14 | 1 | 50 | 19 | | 115 | 38 | | 91 | 31 | | 22 | 52 | 2 | 56 | 47 | 1 | 38 | 58 | 3 | 17 | 31 | 6 |
| | 46 | | | 69 | | | 153 | | | 122 | | | 76 | | | 104 | | | 99 | | | 54 | | |

Grand total = 723.

whether this is the result of infection from other sources, and what is its relationship to the amount of infection in the children of healthy parents, will be the subject of further investigation. The fact here demonstrated is that at all age periods of life it is the infectious consumptive who is the immediate source of by far the largest amount of disease among those living in relation to him.

### *Influence of Sex in Contacts.*

INFECTIOUS PATIENTS.

*In Children under the Age of 15.*

87 males were exposed to infection, of whom 68, or 80.4 per cent., became infected.
74 females were exposed to infection, of whom 52, or 71.6 per cent., become infected.

*In Adults between the Ages of 15 and 25.*

45 males were exposed to infection, of whom 35, or 77.7 per cent., became infected.
36 females were exposed to infection, of whom 24, or 66.6 per cent., became infected.

*In Adults over the Age of 25.*

43 males were exposed to infection, of whom 12, or 27.9 per cent., became infected.
48 females were exposed to infection, of whom 9, or 18.7 per cent., became infected.

According to the English mortality tables from 1881 to 1910, females are less liable than males to succumb to pulmonary tuberculosis under the age of 5, more liable from 5 to 20, and less liable at later ages. In the incidence of infection as determined above, there was no reflection of this, as males appeared to be more liable to infection at all age periods.

NON-INFECTIOUS PATIENTS.

*In Children under the Age of 15.*

104 males were not exposed to infection, of whom 49, or 47.1 per cent., became infected.
107 females were not exposed to infection, of whom 43, or 40.1 per cent., became infected.

*In Adults between the Ages of 15 and 25.*

19 males were not exposed to infection, of whom 2, or 10.5 per cent., became infected.
22 females were not exposed to infection, of whom 3, or 13.6 per cent., became infected.

*In Adults over the Age of 25.*

76 males were not exposed to infection, of whom 2, or 2.6 per cent., became infected.
62 females were not exposed to infection, of whom 4, or 6.4 per cent., became infected.

It is of considerable interest to compare these percentages with certain figures published by J. Edward Squire in 1895 in *The Influence of Heredity in Phthisis.* In the 1,000 families investigated there were 275 in which neither of the parents were phthisical, and in which 24.87 per cent. of the children became phthisical. In my 101 cases of non-infectious tuberculous patients shown above, 26.4 per cent. of the children and contacts developed pulmonary tuberculosis.

### *Sex of Patients in Relation to Infection of the Contacts.*

INFECTIOUS PATIENTS.

*Children under the Age of 15 Years.*

79 were in relation to infectious males, and 55, or 69.6 per cent., were infected.
82 were in relation to infectious females, and 65, or 79.2 per cent., were infected.

*Adults between the Ages of 15 and 25.*

38 were in relation to infectious males, and 25, or 65.7 per cent., were infected.
25 were in relation to infectious females, and 17, or 68 per cent., were infected.

*Adults over the Age of 25.*

63 were in relation to infectious males, and 22, or 34.9 per cent., were infected.
46 were in relation to infectious females, and 16, or 34.7 per cent., were infected.

Under the age of 15 the amount of disease in the contacts is distinctly greater among those in relation to infectious females than among those in relation to infectious males. The difference is still perceptible between the ages of 15 and 25, but over that age it disappears. This points to the quantity of infection as having a direct influence in the causation of the disease among the contacts, for children are likely to receive a more massive dose of infection from the female parent than from the male.

NON-INFECTIOUS PATIENTS.

*Children under the Age of 15 Years.*

61 were in relation to non-infectious males, and 29, or 47.5 per cent., were infected.
150 were in relation to non-infectious females, and 63, or 42 per cent., were infected.

*Adults between the Ages of 15 and 25.*

9 were in relation to non-infectious males, and 2, or 22.2 per cent., were infected.
32 were in relation to non-infectious females, and 3, or 9.3 per cent., were infected.

*Adults over the Age of 25.*

45 were in relation to non-infectious males, and 3, or 6.6 per cent., were infected.
93 were in relation to non-infectious females, and 3, or 3.2 per cent., were infected.

There are three factors, on one, two, or all of which successful inoculation with tuberculosis may depend. From experiments on animals we have a right to assume that the amount of infection has a definite bearing on the fact as to whether or not the infected organism develops tuberculosis. In susceptible animals of the same species a massive dose will be followed by development of the disease, where a smaller dose has been successfully resisted. Secondly, it will be generally admitted that, given the same amount of infection, a person in a low state of general health is more likely to develop the disease than a person in good health. The third possible factor is heredity, it having been held that there is a transmitted predisposition to tuberculosis, whereby under equal conditions of infection the children of tuberculous parents are more liable to develop tuberculosis than the children of healthy parents.

It is known that, while some 60 per cent. of the total population has been infected with tuberculosis, a less proportion actually develops the disease. That in itself proves nothing. The fact that the disease does not advance in all who are infected may have a relationship to one or more of the three factors—to the amount of infection, to the resistance as represented by the general health of the infected person at the time, or to some hereditary qualities in his make-up.

There is a greater incidence of tuberculosis among children exposed to infection from their parents than among children not so exposed—the children of healthy parents. That in itself does not prove that exposure to infection is the determining cause, for it does not eliminate the factors of general health and heredity. It is a fair query to ask, "Would the amount of infection required to infect the children of tuberculous parents be sufficient to infect the children of healthy parents?" To answer this question it would be necessary to have the children of both classes of parents exposed to the same conditions of infection. This does not occur under actual conditions of life, but let us grant it. Suppose that the same amount of infection was sufficient to infect the children of tuberculous and of healthy parents. In that case heredity would be eliminated, and infection alone would remain as the determining element. Suppose that the dose of infection sufficient to successfully inoculate the children of tuberculous parents were not sufficient to inoculate the children of healthy parents. That is no proof that the immunity of the latter is due to the absence of a transmitted predisposition present in the former, for there is still the factor of a possible difference in the state of their general health.

It is a complex equation, but is yet capable of solution, provided we are able to prove that susceptibility or immunity to an equal amount of infection is associated with the presence or absence of some factor which is not hereditary.

When we apply the above test as between the children of infectious tuberculous parents and the children of non-infectious tuberculous parents, the issue rapidly clears. Both these groups are the children of tuberculous parents. the question of whose infectiousness is simply an incident in the disease, and the heredity of their children in regard to tuberculosis is the same. Let us put the question, "Would the same amount of infection required to infect the children of infectious patients be sufficient to infect the children of non-infectious patients?" Granted it were

possible, which it is not, that each group receive an equal amount of infection. Then if the same amount of infection were to equally infect the children in both groups, it would follow that infection must be the principal determining cause of the disease. Again, if the same amount of infection which infected the children of infectious cases did not infect the children of non-infectious cases, it is clear that this difference in susceptibility would be due to some factor other than transmitted qualities common to both, and other than the amount of infection which we postulated as common to both. There is no alternative but that the greater susceptibility in the children of infectious tuberculous patients would be due to a variation in their general health, as representing a lowered resistance to infection. It is also obvious that this variation in general health in the children is in relationship to the presence or absence of infectious qualities in the parents. That is to say, susceptibility to tuberculous infection is dependent in an equal degree upon the amount of infection and the general health of the infected person, and that in the case of children the general health is lowered as a direct result of the presence of infectiousness, as distinct from the amount of infection, in the parents. Heredity has no place in this equation.

Is this theorem compatible with clinical facts and experience? It has been shown that in two groups of children, whose heredity is the same, there is a larger proportion of tuberculosis among the children of infectious parents than among the children of non-infectious parents. At first sight this might appear to indicate that exposure to infection in this case was the sole determining factor. That is not so, for before we could prove it the factor of general health would require to be common to both groups. It would be essential that the children of both classes of parents should be of the same physique, the same development, should have the same amount of nourishment, and should be in similar circumstances of home life. Such conditions, however, immediately render any comparison impossible. The infectious parent is generally in a more advanced stage of the disease, which has begun to affect the smallest circumstances of his life. He is less fit for work, his employment is intermittent, and his wages are less. The female with advanced disease is less able to look after her house and children. She is often laid up, meals are less regular, and the selection and preparation of food is indifferent. All these *immediate* factors tell on the children. They are poorly nourished and ill covered, so that windows are kept closed for warmth. This alone will lower their resistance to tuberculosis and to any other infectious disease, and render them more susceptible than the children of parents in a non-infectious stage of the disease—the heredity of both groups of children being equal, and the amount of infection being equal.

### Conclusions.

1. There is more tuberculosis among the children of consumptives than among the children of healthy parents.
2. This may be due to their exposure to infection, to their lowered general health, or to their heredity.
3. There is more tuberculosis among the children of infectious consumptives than among the children of non-infectious consumptives.
4. This must be due to exposure to infection *plus* lowered general health, inseparable from it as the result of the stage of the disease in the parents.
5. Therefore it is not heredity which determines whether the children of consumptives will develop the disease, but the existence of certain immediate factors which are under our control.

It is not necessary to argue the case further, but it is possible to imagine a last stand being made for the influence of heredity on the following lines: "Granted an equal exposure to infection and an equal lowering of general health, would the children of healthy parents develop the same amount of tuberculosis as the children of consumptives?" If they did, it would prove that heredity had no influence whatsoever. If they did not, it would indicate that the absence of a tuberculous heredity protected them from infection (incidentally simplifying the tuberculosis problem to an extent no one has dreamt of), and that the presence of a tuberculous heredity was the determining cause in the development of tuberculosis among the children of consumptives, which has been proved to be impossible.

Owing to the rapidly increasing number of tuberculosis dispensaries in this country, the data on which these deductions are based may be tested on an unprecedented scale. If they be corroborated, it means that the influence of heredity is disproved once and for all. Of greater import, it will imply that if our present activity against tuberculosis be augmented we may look with confidence to the total eradication of this disease. On the other hand, should it be proved, as has too long been taken for granted, that soil and seed are independent factors, then, even by a direct attack on the seed (by diminishing the sources of the tubercle bacillus), it would be more difficult to completely exterminate the malady so long as the soil remained (as represented by inherited qualities). This is not so. The children of infectious tuberculous patients and of non-infectious tuberculous patients are all the children of consumptives. The difference in their susceptibility to infection is the direct result of the stage of the disease in their parents. What has been termed for a century "soil" is really the result of the pathogenic action of the "seed." Soil and seed are not independent factors, for they are one and the same. If, then, by the co-ordinated Edinburgh system, the disease is controlled at every point, the resistance of the population exposed to infection will also be raised. The truth is this—*that the seed creates the soil.*

References.

[1] Halliday Sutherland, *Edin. Med. Journ.*, 1908. [2] D. J. Hamilton, quoted in ibid.

## A NOTE ON RAT-BITE FEVER, WITH REPORT AND TEMPERATURE CHART OF A RECENT CASE.

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This disease seems so rare in this country, so far as reported cases go, that I think the case described hereafter may be of some interest.

Rat-bite fever, or sokòdu or sokòshio, is a disease, according to Castellani and Chalmers (*Tropical Medicine*), which has been known in Japan, and also in China, for a considerable time and many cases are cited by them, but, so far as I have been able to find, the only cases in this country were three reported by Dr. T. J. Horder[1] (1909–10) and a case in a girl of 3 (1895) by Dr. George S. Middleton (Glasgow).[2] In America several cases have been noted.[3]

In the Epitome of Current Medical Literature (British Medical Journal, August 24th, 1912), a case is quoted by Cesare Frugoni, published originally in the *Berl. klin. Woch.*, February 5th, 1912, which he claims to be the first case occurring in Europe diagnosed clinically and carefully observed. There appear, however, to have been at least two others, one in France and one in Spain.[3]

### *Diagnosis.*

Castellani and Chalmers give the following points:

1. Occurrence of a rat bite.
2. Incubation period of from one to twenty-one days.
3. Periodic form of fever.
4. Negative results of bacteriological culture. (Since then a special parasite, protozoon associated with the neosporidia, has been alleged as the cause. Certain blood changes also noted.)[4]
5. Spontaneous recovery after prolonged duration of disease.

### *Symptoms.*

Three types are described (Miyake):

(*a*) Febrile with a marked eruption.
(*b*) Afebrile with nervous symptoms.
(*c*) Abortive.

The feverish state is accompanied by an eruption of purplish spots. The wound heals during incubation—fever begins abruptly. The site of the bite becomes red and swollen, dropsy may appear, local gangrene is found in some cases. Onset with chilliness, headache, marked weakness, fever, and eruption of dusky-coloured purple spots. Pain may be felt in the abdomen, and diarrhœa may occur. The pulse is rapid and weak, and a feeling of precordial pain and palpitation is complained of. Breathing short; delirium may be present. The disease runs a prolonged course, and recurrences are common at varying intervals.

In one case quoted by Hora[5] there were ten relapses a year for a period of seventeen years.

*Case.*

J. C., aged 51, a gentleman of stout build, accustomed to outdoor sport, was out with his dog on July 8th, 1911. The dog seized a rat and shook it, but did not quite kill it. J. C. went "to finish it off" and caught hold of the hind legs of the animal, intending to strike its head on the toe of his boot. The rat at this moment turned round and bit the middle finger of his right hand, immediately over the joint between the first and second phalanges on the dorsum. The bite bled a little; the patient sucked the wound well and bathed it, but thought little more of it and it healed up. He noted at the time that the rat seemed to be unhealthy—"mangy." About July 17th or 18th the finger became somewhat red and swollen over the joint, but as the patient was subject to attacks of articular rheumatism, he put the swelling and redness down to this, and did not then associate the condition with the bite. On July 21st (thirteenth day after the bite) he noticed in the centre of the swollen area a bluish coloration, and on the 22nd this had become almost black.

I saw him first on this date. The finger was much swollen (brawny induration), red and tender, extending from the knuckle to the distal end of the second phalanx, the chief point being on the dorsum and over the joint between the first and second phalanges. Here there was a bluish-black spot about the size of a sixpence, the margins of which showed slight vesiculation and the centre appeared to be ulcerating. I was then told of the bite, and looked upon

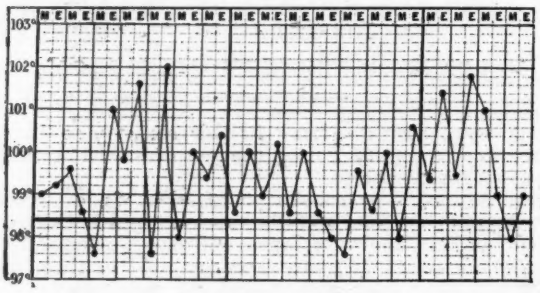



Fig. 1.—Temperature during early fever, twenty-eighth to forty-fourth day (August 5th to August 22nd). Character of temperature lasting four and a half weeks.

the condition as due to some septic infection. It was treated by application of pure carbolic acid, followed by fomentations of lysol lotion.

For the next few days there was little change in appearance but there was a gradual spread of the discoloration and increase in the ulceration. There was no distinct fluctuation to be made out, but the blackish part felt boggy and soft; the cubital and axillary glands were not affected. The temperature was normal and subnormal. On July 27th he was seen by Mr. E. C. Bevers (Oxford) in consultation, and it was decided that the part should be thoroughly opened. This was done under gas, an incision being made on either side of the middle phalanx of the finger down to the bone, and a gauze drain passed through from one end to the other. Absolutely no pus was found, but the tissues were gangrenous and the bone of the middle phalanx was found bared and roughened. The gangrenous process had spread further in the depth than the blackened surface of the skin indicated, and we concluded that if no improvement followed in twenty-four hours the finger should be amputated at the metacarpo-phalangeal joint. Treatment with antiseptic bath and fomentations was continuously applied. Purplish spots showed on the forearm and the under side of the upper arm.

The condition next day showed a still further encroachment of gangrene towards the knuckle. The finger was amputated at the joint and the wound packed with gauze and left open for free drainage. Next day the hand and forearm were placed in a continuous bath—mercury biniodide 1 in 4,000—for twenty-four hours, and afterwards warm boric acid solution. This treatment was kept up for seven or eight days. The wound remained clean and healthy and began granulating. The process continued in a quite normal manner, and the wound was completely healed on the sixteenth day after operation. At no time was any pus to be detected.

The temperature remained normal and subnormal until the eighth day after operation. About this time (August 5th, twenty-eighth day after the bite) the patient complained of intense headache, chilliness, nausea, and feeling of general ill-being. He was sleepless, the face flushed, conjunctiva injected, and the temperature and pulse were raised (see charts). The wound appeared quite healthy, but on the forearm were two dusky, purplish spots, irregular in shape, slightly raised, about the size of a sixpence. On the inner side of the upper arm were several other spots of the same character, six or eight in all. The skin between the spots was not discoloured, nor were there any surface inflamed lymphatic channels such as one sees in acute septic conditions of the hand. The lymphatic glands at the elbow and in the axilla were not palpable nor tender to touch. The patient complained of joint pains in the other arm, and on this also a few spots appeared, similar in character and distribution, but not so bright in colour; there was swelling, pain, and larger dusky spots on both ankles also, but this I attributed at the time to articular rheumatism, to which the patient was subject. He also complained of pains in the abdomen. The temperature and pulse gradually rose until August 9th (fifth day), when it reached 102°. On the following morning it fell to 98° with perspirations during the fall; the temperature rose again that night to 100°. During the height of the early attacks sensibility was dulled, with a tendency to mental wandering—"night-

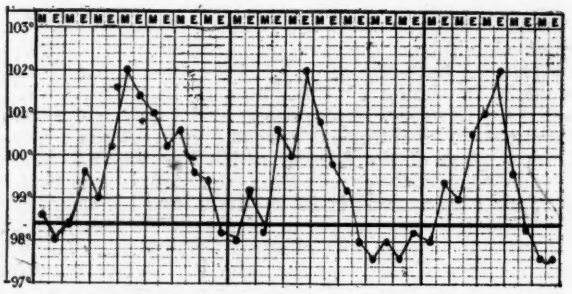



Fig. 2.—Showing the character of the temperature during the later period of fever (from September 15th to October 3rd), and lasting for ten and a half weeks.

mare." The evening temperature for the next four nights reached about 100°, falling a degree or more in the mornings. This was followed by a fall to normal and subnormal for thirty-six hours, then an increasing evening rise for five days, when it ultimately reached 101.8°.

During this higher range the patient's symptoms were again much the same as described during the attack beginning on August 5th. The rash, which had been duller in appearance, again showed up brightly. The range and character of the temperature remained much the same for four and a half weeks, periods of moderate fever rising daily for a few days to an acme of about 102° evening, then falling quickly two or three degrees by next morning. After this, for the next ten and a half weeks, the periodic character of the fever was marked. Onset fairly rapid (two or three days), then highest point; somewhat more rapid fall, then a period of normal and subnormal temperature for about four days.

During the fifteen weeks there were fifteen feverish attacks, all characterized by the same general symptoms. The longest period between the acme of attacks was eleven days, the shortest (the last), which proved to be an abortive attack, was five days. The intermediary attacks showed eight, seven, and six days' intervals.

The patient himself realized the regularity with which his illness and discomfort came, and quite dreaded the Friday, Saturday, and Sunday, and looked forward to the other days of the week.

The disease apparently, in this case, ceased suddenly with an abortive attack about the fifteenth week. The temperature was recorded for a month longer and was normal or subnormal.

During the illness the pulse-rate fluctuated with the

temperature, and towards the end of the illness the heart showed distinct signs of weakness, the first sound becoming faint and signs of dilatation being present. The patient became much thinner and lost over 14 lb. in weight. The bowels throughout were constipated; there was no enlargement of liver or spleen. Urine showed no albumen but often deposit of urates. No late rash was noted.

Convalescence was very slow and he suffered much from headache. He was not able to get about much for six months after the bite, but up to the present time no distinctive manifestations have occurred, though he still occasionally complains of giddiness and headache.

Treatment by various drugs—aspirin, phenacetin, quinine, sodium salicylate, sodium sulpho-carbolate, etc.—did not seem to influence the course of the disease. The two first named were useful when headache was severe. Later on tonics containing strychnine proved useful and the condition of the heart began to improve.

Unfortunately, at the time the finger was amputated the diagnosis of the disease had not been made and a thorough blood examination and culture were not instituted. Later on the patient refused to allow this examination.

For some time the diagnosis was difficult. When Mr. E. C. Bevers had seen the case we concluded that the rat bite was undoubtedly the cause of the condition, and he was kind enough to look up the subject and found Dr. T. J. Horder's article. From the description of those cases and from the after-history of this case the condition became evident.

A short time before the patient was bitten he had been using a virus for the extermination of rats, but whether this could in any way be associated with the disease I cannot say.

A very complete article on this disease is published in the *International Clinics*, Series XXI, vol. iv.

Since writing the above I find a case of rat-bite fever was described at a meeting of the Royal Academy of Medicine in Ireland on December 15th, 1911, by Dr. O'Carroll.[6]

REFERENCES.
[1] *Quarterly Journal of Medicine*, 1909-10, vol. iii, p. 121. [2] *Lancet*, June 11th, 1910. [3] Article by Frederick Proescher, M.D., Pittsburg, Penn., *International Clinics*, Series XXI, vol. iv, p. 77 et seq. [4] Ogata, *Deut. med. Woch.*, 1908, No. 25. [5] Castellani and Chalmers, *Tropical Medicine*. [6] BRITISH MEDICAL JOURNAL, January 6th, 1912.

## A RULING HABIT STRONG IN DEATH.

BY

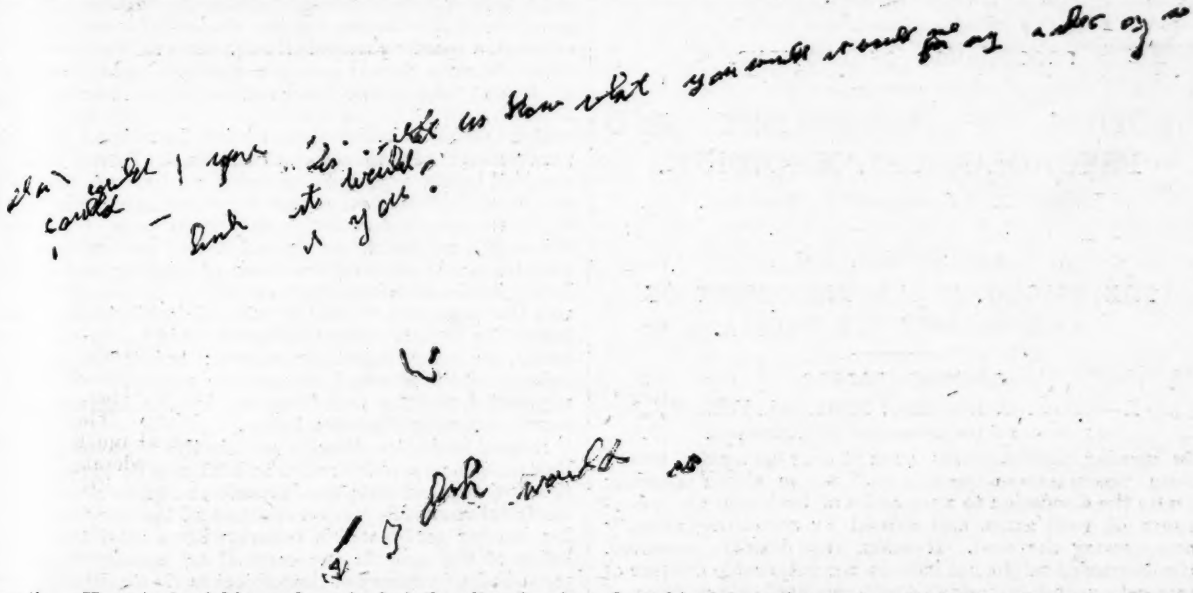
C. H. WATTS PARKINSON, M.R.C.S.ENG., L.S.A.

THE case here reported presents, I think, many points of interest.

X. Y., aged 63, the senior partner of a firm of engineers largely interested in Government and other contracts, with works in South London, an old-school friend of mine, had for some years been failing in health. Five years ago he had rheumatic fever with heart affection, and I saw him with his medical attendant, Dr. Matthews, of New Cross Road. This illness was followed by Bright's disease, but under Dr. Matthews's care he got about again much as usual. Three years ago he had a large carbuncle, which laid him up for two months. He got about his work again, but the albuminuria continued. He could not be induced to take proper care, but exposed himself in all weathers and took long cycling rides with his son. He kept on his work as usual until May, 1912, though his disabilities increased. He then became dangerously ill, the symptoms being those of heart and kidney disease accompanied by cardiac asthma. Dr. Matthews impressed on him the necessity of giving up his work, but he was unwilling to do so, and asked me to see him. I visited him on June 9th. He was then improving as to the acute symptoms, but was clearly unfit for work owing to advanced heart and kidney disease and arterial degeneration. I pressed him to resign himself to the inevitable, and, with Dr. Matthews's consent, undertook to arrange a consultation.

He improved somewhat, however, under treatment, and insisted on trying a few weeks' change at Boscombe; but on July 7th I heard from his wife that he had not benefited by the change, and had made up his mind to return home on July 8th. On July 7th he was pretty well and cheerful; he went up to bed about 10 p.m., and was laughing and joking with his wife and son. About 11.30 he was seized with a very violent attack of breathlessness, and got out of bed. His wife found him lying on the floor. With the help of her son he was got on to the bed; it was observed that his left side was useless. He asked for the asthma medicine and various things, and talked sensibly, though his voice was somewhat peculiar. Dr. Richardson, of Boscombe, who had been sent for, gave full instructions, but made a serious prognosis.

The patient talked incessantly until daylight, when his speech became more and more unintelligible, his neck began to swell, and he grew more unconscious. At 10 a.m. on July 8th he appeared quite unconscious, but he went through the motion of taking out his eyeglasses, putting them on, taking his fountain pen from his pocket, and then writing a letter on the bedclothes. During this morning he tried at times to throw off the bedclothes to get out of bed to pass water; and his wife thought, when she took his hand and asked him to kiss her, that he pressed her hand and pursed up his lips.



I saw him late on the evening of July 8th. He was lying on his back in bed quite unconscious. His face and neck were swollen, his eyes half closed, and the eyeballs prominent. Breathing was somewhat stertorous, quick and irregular, the mouth partly open, and the tongue swollen and dry. The pulse was full and hard, he was quite comatose, and apparently in a hopeless condition. On the morning of July 9th he was quiet and seemed quite unconscious; he was breathing heavily and unable to swallow, but at 10 a.m. he again began to go through his habitual procedure when about to write. His wife was inspired with the idea to see if he could write, and got a writing pad with some paper, put his fountain pen in his fingers, and guided his hand to the right place. He began to write a long and evidently business letter, crossing his t's, and when he thought he had got to the bottom of the first sheet of paper, he turned it over with his little finger (a habit of his) and went on writing on the second sheet.

He continued quite unconscious all day, and on the morning of July 10th made no motion or attempt to write, and continued

until the following evening, when the breathing became easier, the swelling of the neck went down, and he swallowed a little fluid given him by Dr. Richardson; a trying cough came on, and his chest seemed clogged up and his mouth full of blood. He died on July 12th, having given no sign of consciousness or answer to his wife's frequent appeals to notice her since July 8th. During the illness there was no action of the bowels, and nothing swallowed until the evening of July 11th, but urine was passed regularly up to the last.

I have set down carefully the account given me by his wife, who was constantly with him. Mr. F. was very methodical in his habits, and had little tricks and habits which were quite characteristic. He went to the works every day about 9 a.m. and had a general look round, and sat down in his office at 10 a.m. to look to his correspondence, and it was at this hour that on July 8th and 9th he began to try and write on the bed; evidently it was a business letter. His partner had written to him that an important customer had called at the office respecting a large order, but would wait to see Mr. F. himself on his return, and probably the letter he attempted to write was in reference to this appointment. The writing, although words, as will be seen from the facsimile, are quite clear here and there, is not sufficiently connected to be intelligible, but I think this was due to the insurmountable difficulty of keeping the pad in apposition with the pen; this, indeed, is clear from the writing itself. The fact that no attempt to write was made after July 9th was, I think, due to continuing haemorrhage. Clearly this was a case of ingravescent apoplexy. I am content to record the facts and leave the explanation to others.

EIGHTIETH ANNUAL MEETING

OF THE

# British Medical Association.

*Held in Liverpool on July 19th, 20th, 22nd, 23rd, 24th, 25th, and 26th.*

## PROCEEDINGS OF SECTIONS.

## SECTION OF NEUROLOGY AND PSYCHOLOGICAL MEDICINE.

LANDEL ROSE OSWALD, M.B., President.

## DISCUSSION ON THE DIAGNOSIS AND TREATMENT OF COMPRESSION PARAPLEGIA.

### OPENING PAPERS.

I.—ERNEST S. REYNOLDS, M.D.Lond., F.R.C.P.,
Physician to the Manchester Royal Infirmary.

IN opening the discussion I am at once confronted by the term "compression paraplegia," which taken literally limits the discussion to a paralysis of both legs and sometimes of both arms, and caused by something actually compressing the cord. If taken thus literally, however, the discussion might not include a considerable number of interesting and important cases, amongst others those of unilateral compression, those of secondary new growths (in which paraplegia may not be present), those very difficult cases of compression paraplegia in the early stages, and also intramedullary tumours.

*Causes.*

It is necessary, however shortly, to mention the principle causes of compression paraplegia, and it is simplest to work from without inwards.

First, aneurysms, chiefly in the dorsal region and after eroding vertebrae, tumours sending in a tongue of tissue through the intervertebral spaces (naturally causing unilateral symptoms at first), and parasitic cysts, generally hydatids, similarly reaching the cord from subpleural or abperitoneal connective tissue.

Secondly, affections of the vertebrae. Traumata, such as fracture dislocations and injuries without apparent breach of continuity (about which I will say something later in considering diagnosis in "compensation" cases); syphilis very rare; tuberculous caries most common of all, principally in the dorsal region, and often causing symptoms only secondarily and sometimes by quite simple and transient cord changes, such as oedema; tumours, generally malignant, sometimes primary, either sarcoma or myeloma, or secondary, carcinoma, sarcoma and lymphosarcoma, often with a very small primary growth in the breast, sometimes overlooked, or removed two or three years ago, or rarely a growth in an old enlarged thyroid gland.

Thirdly, the spinal meninges. Here it is of course possible that the cause, if a tumour, may be in the dura mater only, an important point from a surgical standpoint, but often the pia arachnoid is also affected. The affections are: Haemorrhages seldom causing marked spinal symptoms if extrathecal, but marked symptoms if intrathecal; inflammations, spreading from without, as from bedsores; slow chronic inflammations causing local thickenings either in the dorsal or lumbar regions, or in the cervical region (cervical hypertrophic pachymeningitis), sometimes possibly the result of injury; tubercle and syphilis, the two commonest affections; and tumours, extra-dural chiefly in the dorsal region, sarcoma, fibroma, lipoma, and intradural arising from the inner surface of the dura mater, or from the pia arachnoid, such as sarcoma, fibroma, psammoma, myxoma, lipoma, endothelioma, or parasitic cysts. Intramedullary growths may of course cause compression of the cord from within outwards, and if possible, especially for surgical reasons, should be diagnosed from extramedullary growths; they are more rare than meningeal tumours, and include solitary tubercle, glioma, sarcoma, gumma, and myxoma. Tumours of the cauda equina, of course, must not be forgotten.

*Symptoms and Regional Diagnosis.*

Obviously in dealing with paraplegia one should first mention *the motor symptoms*. These may vary from a mere feeling of tiredness and heaviness of the legs to a total loss of power, which may be due to an atrophic paralysis if the cauda equina or lumbo-sacral cord is affected, a spastic paralysis if only some part above this is involved, or a flaccid (not necessarily atrophic) paralysis if a part above the lumbo-sacral cord is completely divided.

If the lesion is in the cauda equina there is an atrophic paralysis of the leg muscles; this is usually limited to those supplied by the sacral plexus, but if the lesion is extensive nerves not higher than the third lumbar may be affected. If in the conus terminalis only (that part of the cord below the origin of the second sacral nerve), the only muscles paralysed would be those of bladder and rectum. In the lumbo-sacral enlargement below the second lumbar root the paralyses would be atrophic with loss of knee-jerks. Anywhere above this there would be, in the parts below, as a rule spastic paralysis; but if the cervical enlargement is involved, an atrophic paralysis of muscles supplied from the area involved by the lesion and, of course, a spastic condition below.

It would take too long to go into the whole question of Bastian's theory, put forward in 1890, of a flaccid paralysis (without marked atrophy of muscles, no great alteration of electrical reactions, and no affection of the grey matter in the lumbar cord), which occurs with a total transverse lesion of the cord in the cervical or lumbar regions. I published a summary of the subject in *Brain*, 1895, and an excellent more recent account of the matter is to be found in the *Medical Chronicle*, vol. xxxvii (1902–03), p. 101, written by Dr. Warrington. This later account on the whole confirms Bastian's view that if the lesion is total, involving, therefore, the destruction not only of the pyramidal tracts but also of the mesencephalic long efferent fibres in the antero-lateral regions of the cord, a flaccid paralysis ensues. It must, however, be remembered that there may be, as I showed some years ago, a total anaesthesia and total paralysis below a dorsal lesion, but with markedly spastic paralysis. The only new contribution I can give to this subject is that of a gentleman who had a flaccid paraplegia due to a small dural tumour at the sixth dorsal level; this flaccidity lasted for many months, and was gradually replaced by a typical spastic condition of the parts below the lesion.

*Ataxia.*

In three cases I have seen—two of caries and one of tumour—there has been present considerable ataxia on walking; in two of the cases the ataxia was very similar to that met with so commonly in disseminated sclerosis; while in the third, where the pressure was high up in the cervical region, the ataxia was more of the cerebellar type. Whether this ataxia is due or not to pressure on the posterior parts of the cord I cannot say, but most likely it is so. It is obvious that its presence may increase greatly the difficulties of diagnosis.

*Sensory Phenomena.*

Here we must consider tenderness and pain on movement or on application of a hot sponge, local constant spinal pain at the seat of the lesion, and pain along nerves involved in the lesion; also various types of paraesthesia and anaesthesia.

Tenderness on pressure and on the application of a hot sponge may occur with many if not most of the lesions causing compression, such as chronic localized meningitis, caries, or tumour. It is, of course, of some significance, but is largely discounted by the fact that it is such a marked feature in many cases of neurasthenia, especially of the type well called "spinal irritation," of traumatic neurasthenia, and even in malingering, and the fact that the situation of the tenderness in these functional cases is most commonly at the sixth or twelfth dorsal spines does not help one much. A more useful diagnostic sign is the character of pain on movement, for in the case of tumour, especially of the vertebrae, movement causes an agonizing pain almost characteristic, though again it must be remembered that osteo-arthritic affections of the spine may cause great pain. As regards local constant pain in the vertebrae, this may be very severe, and is of a burning or stabbing nature, and is found principally either with aneurysm or with new growths, and not so much with other causes of compression.

Pain along the course of nerves may be very severe, almost of a neuralgic character, sometimes accompanied by numbness of the same area, the well-known anaesthesia dolorosa. This pain may be due to pressure on nerve roots, and, if so, is of great value in localizing the seat of the lesion; it may be unilateral or bilateral down both arms, or as a girdle pain, or down both legs, varying, of course, in position according to the nerve roots affected. And here I would like to emphasize the great importance of Charcot's dictum that double sciatica is almost invariably due to pressure on nerve roots or nerve trunks, and a similar rule applies to cases of double "brachial neuritis." Other pains along nerves may be due to pressure on sensory fibres in the cord, in which case, however, the pain is referred to an area of distribution considerably below what one would expect from the situation of the cord lesion.

Various types of paraesthesiae, tinglings, formications, and indefinite numbnesses difficult to test objectively, may occur at the seat of or below the lesion in compression paraplegia, but these are much more common in disseminated sclerosis, as will be mentioned below.

Finally, of course there may be total anaesthesia to all types of sensation below the lesion, and here must be mentioned the well-known rule that the upper limit of the anaesthesia is below the level of what one would expect from the actual position of the lesion itself; and this will be found to be much more the case if the upper limit of anaesthesia be tested on the back rather than on the front of the body. For instance, in one of my cases a lesion in the neighbourhood of the sixth dorsal root caused an anaesthesia with an upper limit at the seventh intercostal space in front, but of the eleventh intercostal space at the back, the upper limit of anaesthesia being thus a line almost at right angles to the vertical line of the body, instead of obliquely downwards and forwards from the seat of the lesion, as one might have expected.

*Deformities of the spinal column* are found principally in three types of compression paraplegia—namely, traumata, caries, and tumour. The spine may be held in a more rigid condition than usual to lessen pain, the natural curves may be exaggerated, or there may be a lateral curvature. A point to be remembered in the case of traumata is that there may be great compression without obvious deformity. In caries, of course, the deformities are well known, but in tumours they are not so common. In two or three cases of secondary vertebral growths I have noticed a peculiar, somewhat indefinite thickening of the vertebrae and the parts covering them in the lower cervical region, and in another case of "double sciatica" the cause was made evident by a great thickening of the spine in the dorso-lumbar region. The importance of an examination of the spine in cases of loss of power or pains in the legs cannot be too strongly emphasized, and yet it is remarkable how frequently such an easy procedure is not performed.

Ocular symptoms, manifested by alteration of the size of the pupils, may occur if the lesion is above the second dorsal root. If merely irritative the pupils may be dilated, but more frequently, perhaps, there is a contraction (sometimes unilateral) from paralysis of the dilating sympathetic fibres, and in such a case painful stimulation, say, of the skin of the neck, will fail to dilate the pupil as normally occurs.

Cardiac symptoms may arise from a lesion of the accelerator fibres of the heart running down the cord from the fourth ventricle, and if irritative will quicken the pulse, if paralytic will slow it.

Similarly, respiratory paralysis of some or all of the intercostal muscles may occur, breathing being carried on by the diaphragm innervated by the third and fourth cervical roots. In one case which I saw with my colleague, Mr. Thorburn, the lesion was above the origin of the phrenic nerves and respiration was carried on for some days by the extraordinary muscles of inspiration in the neck only.

Various symptoms of vaso-constriction, such as pallor and coldness of the paralysed parts, with a dry harsh condition of the skin; or of vaso-dilatation, as shown by oedema of the skin and accumulation of fluid in joints such as knees or ankles may occur, as well as penile erections, according to the situation of the lesion.

The principal visceral lesions relate to the bladder and rectum, in which as regards localization we may take the bladder as a type. If the lesion is a destructive one of the lowest parts of the cord the bladder will be in a cadaveric position—a mere flabby bag through which the urine dribbles from the ureters. If the lesion is in the dorsal region the affection of the bladder is such that it works automatically by pure reflex action independent of the will; and there may be an intermediate condition of retention overflow in which the sphincter is in a state of spasm but the detrusor is paralysed.

The sweat glands may in an early stage be in a state of paralytic hypersecretion, but in a late stage fail entirely, leaving the skin dry and harsh.

Trophic changes in the skin, referred to above, may occur. Herpes may occur and, if so, often help to localize the lesion; it may be unilateral, but in one case I saw it was bilateral.

Bedsores may occur, especially if the nursing is not of the best. If the lesion is intramedullary, bedsores may be very acute, very rapidly spreading, and quite beyond the prevention or control of the nurse.

The urine should always be carefully examined for Bence Jones albumose with its very typical reaction, the deposit falling at a much lower temperature than does albumen, and the nitric acid coagulum dissolving with heat to reappear on cooling. This peculiar type of albumose is associated with myeloma, which, when it is present, may affect the vertebrae, and sometimes a definite history of previous injury can be obtained. I think these cases are probably commoner than is supposed, as I have myself seen four such cases in the last three years.

Before dismissing the symptoms of compression paraplegia I should like to allude for a moment—as to my mind they are most important and are much commoner than is usually supposed—to those cases of growths of the vertebrae which are secondary to growths elsewhere, especially of the breast. These have been admirably dealt with by Sir William Osler in a paper in the British Medical Journal some four or five years ago. They are important for this reason, that, although they may cause definite symptoms of cord compression, yet very many in the early stages only cause symptoms exactly resembling certain cases of neurasthenia or of hypochondriasis, and are often diagnosed as such, not only to the discomfort,

of the patient but even more to the discomfort of the practitioner.

The account given above of the symptoms of compression paraplegia will perhaps be sufficient as indicating the methods to be used in diagnosing the seat of the lesion, and unless one's memory is very good, reference may be made to tables and diagrams in the textbooks referring to both motor and sensory innervations of definite areas. Nor must we forget the value of radiography, but I would warn my hearers not to place too trusting a reliance on this method, using it only as a servant and not as a master.

Diagnosis of the nature of the lesion is often a much more difficult problem than the diagnosis of its seat. Traumata may give little trouble, but when one has to separate inflammations, tubercle, syphilis, tumours, and parasites, difficulties will arise. The diagnosis of parasites may be mere guesswork unless there is definite evidence of their presence in some other part of the body. Localized thickenings of the membranes, again, may never be suspected but only be found on operation; tubercle may be quite easy to diagnose on general principles, but at other times, as, for instance, solitary tubercle of the cord, may be impossible to separate from gumma or new growth. Syphilis, thanks to the Wassermann reaction, is now simpler than was formerly the case, and a definite history of infection is always a strong point in favour of its presence as a cause of the paraplegia. It would take too long to mention the many ways in which syphilis may affect the cord and its surroundings, varying as they do from a syphilitic caries to an intramedullary gumma, but I might mention how very difficult it is to differentiate a transverse syphilitic lesion causing paraplegia from Erb's type of syphilitic spinal paralysis, a systemic affection of the pyramidal tracts.

Finally comes the diagnosis of cord tumours. Having excluded the affections above mentioned, tumours must very strongly enter into our minds, not only as to their presence, but whether intramedullary, meningeal, or vertebral, and, if possible, their pathological nature. An important point is the history of the steadily progressive nature of the symptoms, and, moreover, as Schultze has pointed out, the fact that in spite of the advance of the symptoms they do not extend upwards. A primary growth elsewhere may be of great importance in the diagnosis.

In vertebral growths swelling or deformity may be found, and pain on movement or pressure is very great; in meningeal growths pain and symptoms of nerve root irritation, limited in distribution, first occur, and are followed by steadily increasing paralysis and anaesthesia. In intramedullary tumours there are symptoms of a transverse spinal lesion of gradual onset and root symptoms are absent or slight, and there may be dissociation anaesthesia, loss of sensation to pain and temperature, but retention of tactile sensation. Occasionally, as Schultze has mentioned, pain may be absent in meningeal tumours, and in such a case exact diagnosis may be impossible.

As regards the nature of the new growth, a correct diagnosis may be made if the growth is secondary, and these, by the way, are usually extramedullary, but otherwise it may be impossible to differentiate between glioma, sarcoma, solitary tubercle, or gumma.

*Diagnosis from other Diseases.*

There are numerous affections of the nervous system in which at first sight it might seem that one was dealing with a compression paraplegia and in some the diagnosis from this condition may not be at all easy.

Spastic diplegia of infancy (so-called Little's disease), especially if the causal meningeal haemorrhage and subsequent cortical changes are limited to both cerebral leg centres, may simulate a lesion compressing the cord in the dorsal region, but the history of the case, the peculiar athetotic movements of the affected limbs, and the absence of sensory or trophic phenomena should be sufficient to establish the diagnosis.

Amyotrophic lateral sclerosis may simulate a cervical compression lesion with atrophy of arm muscles and spasticity of the legs. But in this disease there is also much rigidity and increased myotatic reaction in the arms, a jaw clonus, an entire absence of sensory symptoms, and a gradually increasing bulbar paralysis.

Progressive muscular atrophy, again, may simulate a cervical compression lesion, especially as in some cases, besides the typical atrophy of the muscles of the upper limb, there may be some pain in the arms and sometimes an increased knee-jerk. But the disease is a very slowly progressive one, the atrophic muscles show marked fibrillary contractions, give no reaction of degeneration, at any rate for a long time, and there is no anaesthesia.

Cervical ribs may easily suggest a unilateral compression (and rarely, if double, a bilateral compression) of the cervical cord, causing, as they do, marked sensory phenomena, pain, and anaesthesia, as well as muscular atrophy, but an *x*-ray photograph generally clears up the diagnosis, and there are, of course, no symptoms in the legs.

In syringomyelia, again, one has generally an atrophy of arm muscles, with a spasticity of the legs, but pain is absent, and there is generally a marked analgesia, but no anaesthesia; the sensory phenomena often have a peculiar patchy distribution, trophic changes, and arthropathies may be present with a lateral curvature. Generally such cases are due to a central gliomatosis destroying the central parts of the cord, and compressing the outer parts from within outwards. The duration is often very long, and the disease may intermit.

Haemorrhage, thrombosis, and embolism of the cord may simulate compression, but the very sudden onset of symptoms should, as a rule, be sufficient for a diagnosis, although symptoms from genuine compression (even non-traumatic) may be rather sudden in onset.

Localized acute myelitis is rapid in onset; early bedsores may occur, and there are no root pains. But a subacute myelitis may resemble closely a compression lesion, especially when it is remembered that the cord lesions from compression may be merely those of oedema or acute myelitis, and not an actual crushing of the cord itself.

In subacute combined sclerosis (described some years ago by Putnam and Dana, and more recently by other observers) there is at first a spastic paraplegia, which gradually passes on to a flaccid paralysis, with loss of knee-jerks, and much ataxia, but there are no symptoms of real cord compression.

In hysterical paraplegia, and also in cases of malingering after injuries (especially slight injuries), and "strains of the back" in compensation cases, considerable difficulties may arise as to whether one is not really confronted with a compression of the cord, and such cases are often a great anxiety lest injustice be done to the patient. In making a diagnosis the whole circumstances must be taken into consideration; and as regards details, the absence of the toe-lifting sole reflex, of true ankle clonus, of atrophy, of abnormal electrical reactions, of a gait typical of true disease—and this can only be properly estimated by seeing the patient walk with bare feet—and of sensory phenomena distributed in proper anatomical positions, and not as occurs in hysteria and malingering in anatomically impossible positions, such as anaesthesia bounded by a transverse line in the neighbourhood of a joint; remembering always that, if any doubt finally remains, the patient must have the benefit of it.

I have left until the last disseminated sclerosis, which is by far the commonest organic affection of the nervous system, at any rate in the Manchester area. In most of the cases there cannot be any confusion with cases of compression paraplegia, but in others, especially, of course, those in which the obvious symptoms are apparently caused by a patch or patches in the dorsal region, the diagnosis from compression paraplegia may be difficult. There may be considerable pain in the back, slight girdle sensations, slight anaesthesia or paraesthesia in the legs, affection of bladder and rectum, a marked spastic gait, and absent abdominal reflexes. But as a rule there is no acute pain in the legs (although I have seen one case with much pain in one leg), the anaesthesia is comparatively slight and cannot easily be defined by objective testing; there is nearly always considerable ataxia, as well as spasticity; there is a history of gradual onset (though sometimes the onset is rather acute). Other aids in the diagnosis are a previous history (often many years before), of some eye symptoms, such as partial blindness or double vision, generally temporary in character; or there is a very slight affection of speech, very slight ataxia of the hands, or numbness of the fingers.

*Treatment.*

There can be no doubt that, as a rule, the only treatment for compression paraplegia is surgical. The only cases where non-surgical treatment is justifiable are syphilis, those in which the cord is obviously crushed beyond chance of repair, and possibly some cases of tuberculous caries. If the case is clearly syphilitic the usual remedies are, as a rule, sufficient if the paraplegia is due to real compression from gumma or gummatous inflammation; and if the symptoms are in reality due to chronic syphilitic changes not causing compression, operation is of no more use than is any medical treatment, which of course cannot remove a scar.

As regards tuberculous caries, the rule should be, I think, to operate and relieve compression rather than to trust to prolonged rest, which may, as one knows, sometimes allow the compression to subside, but always with the great risk that the cord may be permanently damaged.

I have seen such good results from laminectomy that I now often urge it should be done not only in cases of *certain* cord compression, but also in those doubtful cases where after most careful consideration it appears likely that compression *may* be present, and, having made up one's mind, the earlier the operation is performed the better for the patient.

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II.—Sir VICTOR HORSLEY, F.R.S.

SIR VICTOR HORSLEY said that he approached this matter from the point of view of the surgeon called upon to relieve the compression. Paraplegia was, of course, a symptom, not a disease, and the failure to recognize this fact had often led to its treatment symptomatically instead of surgically. No one would dream of waiting to operate in cancer until the glands were affected, and in the same way in these cases under discussion none should await the onset of paraplegia. Turning to the indications for operation the speaker first alluded to fractures of the spine due to direct violence. These fractures always caused compression, though often there was no deformity. Also the circulation might be cut off and fragments driven in. Such cases should always be operated upon at once. With regard to those due to indirect violence, all partial cases and also moderate cases should be operated upon; but with severe fractures many points had to be taken into consideration before deciding. The position of the injury at once gave a guide. If there were evidences of vaso-motor paralysis—carmine blush of arms, etc.—such cases were hopeless, and he had always refused to operate. In fractures of the dorsal and lumbar region the question was one of anatomical evidence. Severe laceration of the cord always negatived operation, but partial or moderate cases should be operated upon. Sir Victor pleaded for a revolution in the treatment of fracture cases in the matter of position of the patient. Lying in bed was to be avoided; the normal position was vertical, and sitting up in bed, even suspension, etc., were to be advocated as soon as ankylosis was completed.

Turning to tumour-compression, early diagnosis was all-essential. Frequently at the operation where tumour had been diagnosed, none was found, but only thickening of the meninges. With regard to caries paraplegia there ought to be no such thing in clinical medicine, and its occurrence was clearly a fault of too long delayed surgical treatment. Lastly, the speaker referred to the invaluable aid of radiography in caries, and said that often the amount of tuberculous disease could be made out in this way.

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**DISCUSSION.**

Dr. C. M. HINDS HOWELL (London) said: In a discussion such as this it will not be out of place to refer to the pathology of certain cases of compression paraplegia, as this throws an important light both on diagnosis and treatment of these cases. I have had the opportunity of examining *post mortem* 14 cases of this kind during the last four and a half years at the National Hospital, Queen Square—4 spinal caries, 9 tumour, 1 circumscribed serous meningitis.

The first case to which I wish to draw your attention was one of the kind described by Horsley as "circumscribed serous meningitis." In this condition adhesions form in the subarachnoid space, with the result that cerebro-spinal fluid becomes encysted and gradually produces compression of the cord.

In the case in point the patient's symptoms of gradually increasing spasticity and weakness in the lower extremities dated from two years previously, and there was, in addition, relative but not complete sensory loss as high as the seventh dorsal segment. The man's age was 52, and he was very stout and a bad subject for operation. He died shortly after operation, at which the cyst referred to had been opened and the cerebro-spinal fluid evacuated. The cord was carefully examined by various methods (Weigert Pal-Marchi and haematoxylin and eosin), but no pathological changes or secondary degeneration was found.

We do not know how or why the adhesions to which I have referred, and which result in the formation of a cyst, are produced. In the case in point there was no inflammatory condition present in the leptomeninges, nor any evidence of syphilis, either of which might conceivably be predisposing circumstances in its production. One knows from the recovery which has taken place in similar cases after operation that loss of function precedes alteration in anatomical structure, but this case furnishes material proof of the truth of this, and is therefore of importance. It shows that symptoms may exist for so long as two years, at any rate, without irreparable damage being done to the cord. Of course, this should not be used as an argument for waiting too long before calling in surgical aid, but at the same time it shows that surgical interference may prove successful, even when symptoms have existed for a considerable time.

If the pressure is more pronounced structural changes take place in the cord, to which the term "pressure myelitis" has been applied. The name is unfortunate, as there is no inflammatory condition proper present, but softening is produced, either owing to the production of ischaemia from pressure on vessels or actual thrombosis, or caused by the development of oedema. In any of these cases proliferation of neuroglia takes place in the affected segment and secondary degeneration results.

With regard to extramedullary tumours, these are for the most part, if primary, situated within the dura. Extrathecal primary growths are certainly more rarely met with, and only one such case is included in these nine cases of extramedullary tumour. It is not possible, I think, to say with certainty before operation whether a tumour is extrathecal or intrathecal. It might be thought that the intrathecal growth would give rise to loss of function more rapidly than extrathecal; but this entirely depends on the rate of growth of the tumour. In one of the nine cases an intrathecal growth (a myxosarcoma) had been present for five years, and had taken three years to produce complete paraplegia; in the extrathecal case the symptoms had developed completely in less than a year. It is not always easy to diagnose the position of the tumour with regard to the spinal cord. In some cases the lesions due to the growth are found in the cord, immediately beneath the tumour, and sometimes on the side opposite to the growth. Again, in some cases the damage takes place centrally, leaving the more peripheral parts of the cord relatively intact. Again, in other cases of tumour of slow growth pachymeningitis is produced which may give rise to symptoms of itself, due to vascular disturbance or root involvement quite apart from the tumour. It is an interesting fact that there were two primary extramedullary tumours present in one of the nine cases of spinal tumour that I have examined *post mortem*. It is important to remember the possibility of such an occurrence, as it may introduce difficulties in the way of diagnosis. In the case mentioned the two growths (fibro-sarcomata) were close together, and would have been discovered at operation. The case came too late into hospital, and in consequence no operation was performed. It would be interesting to hear if Sir Victor Horsley has experience of such a condition occurring more often.

Turning now to spinal caries, we find the commonest cause of paraplegia to be compression of the cord within the theca, by tuberculous débris, or abscess pressing backwards through the posterior common ligament. The mechanism here is practically the same as that which operates in cases of extramedullary tumour. Bony compression very rarely occurs, but occasionally a sequestrum of bone separates and causes compression by so doing. But there are other causes of paraplegia than direct pressure on the cord. These are: (1) Ischaemia of the

cord produced secondarily to the development of pachymeningitis; (2) the production of acute localized oedema of the cord. It seems to me very doubtful if either of these conditions once formed can be benefited by operation. The former may take place in two stages, which are well illustrated by the specimens exhibited herewith.

In the first stage the outer part of the dura becomes involved by the tuberculous inflammatory process, which gradually surrounds it. As a result of this fibrous tissue forms, and as occurs elsewhere, contracts with direct effect on the vascular supply of the cord. In the specimen exhibited here, this has resulted in central softening and necrosis. In a case of this kind operation will naturally produce no good result, nor will it in the next case, which is simply a more advanced type of the condition I have just described. In the specimen exhibited the shrinkage and contracture of the fibrous tissue has proceeded further, and the cord is involved to such an extent that it has undergone complete disorganization.

With regard to those cases in which acute oedema occurs without direct pressure on the cord there is, as a rule, no marked bony deformity, and the nature of the case may be overlooked, unless a radiograph is taken. As an example of this kind of case I would like to quote the following:

A. R., aged 30, admitted into the National Hospital under the care of Dr. Tooth. Duration of the disease, fifteen months; duration of paralysis, seven months; no power of voluntary movement in the limbs; reflex movements still strong. Spasticity present with ankle clonus and extensor plantar response. Slight prominence of ninth, tenth, and eleventh dorsal spines. Operation was performed by Mr. Sargent. It was seen at operation that there was no obvious pressure on the cord either by caseous material or by bone, nor was there any pachymeningitis or tuberculous granulation tissue within the spinal canal. The theca was drawn on one side and a pointed probe was used to test the bodies of the vertebrae. This discovered an abscess cavity, which was scraped out, from 1 to 2 drachms of white caseous material being removed. Five weeks after operation the patient developed symptoms of meningitis, and a week later died as a result of diffuse tuberculous cerebro-spinal meningitis. I made the *post-mortem* examination.

On opening the spinal canal the dura mater was found to be entirely free from any pressure, either from bony displacement or tuberculous exudation. At the seat of operation the bodies of several vertebrae were found to be carious, and there was a cheesy exudation under the posterior common ligament over a distance of several inches, but this had exerted no pressure on the outer surface of the dura, and there was no adhesion between the dura and posterior common ligament. When the dura was opened, the spinal leptomeninges were seen to be the seat of what proved to be tuberculous meningitis, which was much more pronounced in the cervical and upper dorsal segments of the cord than at the lesion at the tenth dorsal segment. The ordinary shape of the cord was unaltered, but the tenth and eleventh dorsal segments felt distinctly soft on palpation, as compared with other parts of the cord.

After hardening, sections were cut from all segments of the cord from the ninth dorsal downwards, and examined by haematoxylin and Weigert-Pal methods.

Examination by haematoxylin and eosin revealed the following conditions: (1) The general shape of the cord was well preserved, and the grey and white matter retained their relative positions. (2) A fairly intense leptomeningitis of tuberculous nature was present. It was most marked in the cervical region, and hardly affected the softened segments of the cord at all. (3) The blood vessels were very much engorged, and the inflammatory exudation in the perivascular spaces was intense. No thrombosed vessel was found in any of the sections. (4) The condition of the white matter was very striking in the softened segments. There were present a very large number of smaller or larger vacuoles, some of which had coalesced. This appearance denotes a condition of acute oedema, and excludes disintegration of nervous tissue, due to softening from direct pressure or from vascular occlusion.

The Weigert-Pal method illustrates the presence of oedema, and shows, further, that such oedema is sufficient to produce secondary degeneration in the tracts of the cord.

I have laid some stress on this case because the condition does not seem to be very well recognized, and also because it indicates a complication that is to be feared—namely, the development of tuberculous meningitis following operation on a carious spine.

A further point of importance from a clinical aspect that I would like to make is that pressure will affect the longest neurons first, and it may take some time before the shorter ones are involved. For this reason motor paresis usually precedes sensory loss, a fact which may indicate greater vulnerability of motor as compared with sensory neurons, and also may be misleading as the earliest sensory disturbance may point to the level of the compression as being much lower than it eventually proves to be.

As a physician, I must protest, with very great deference to Sir Victor Horsley, against his position that paraplegia ought to be prevented in spinal caries by early operation. I quite agree that paraplegia ought to be prevented, but not, in my opinion, by early operation. I think if spinal caries is properly treated medically, paraplegia will hardly ever develop. That, at any rate, is the experience of Dr. Gauvain, at the Treloar Home for Tuberculous Children at Alton, where, I am told, there has only been one case of paraplegia in a very large number of cases of spinal caries, which have been cured by appropriate medical treatment.

Dr. WARRINGTON (Liverpool) said that statistical inquiries, chiefly by American authors, had shown that operation, after fracture dislocation where total transverse section of the cord appeared from the symptoms to be probable, was attended by a somewhat less mortality than when a waiting treatment was adopted. Nevertheless, the enormous mortality in such cases, the results of *post-mortem* examination and the little benefit that could follow, even if life were preserved, made the desirability of this immediate operation in his opinion very doubtful. Continuing, he said: Compression of the spinal cord, from caries of the vertebrae, is not very often seen, and no doubt this is rarer than was formerly the case. Perhaps the next common form is a compression from secondary malignant deposits in the bones, other forms of new growths or aneurysm. The interest in these lies purely in the diagnosis, and I therefore do not propose to say anything about them beyond remarking on the sinister significance of a localized pain radiating from the spine. I have several times seen this symptom in women in good general health, coming on two to three years after a removal of a carcinoma of the breast, and have watched or heard of the melancholy sequel. As a rule the diagnosis of a primary compression is not very difficult, for, as tersely put by Allen Starr, "in no other form of disease of the cord do the symptoms of transverse myelitis of gradual onset coincide with the symptom of persistent pain." I do not think that nowadays a syphilitic lesion is likely to be overlooked. The chief difficulties are in the diagnosis of painless compression and in disseminate sclerosis of the spastic paraplegic type.

As my contribution to the debate I should like to mention briefly three recent cases. The first is an example of a difficulty in diagnosis and failure to find a compression. This case being the first in eight under my own immediate observation in which the surgeon has not revealed the expected lesion has a special personal interest:

A young married woman of 26, some nine months ago began to be weak in the left lower limb, a month later the right lower limb was affected. Inability to hold the urine was also noted at this time. On admission the patient was a healthy looking young woman with no medical antecedents of importance; the cerebro-spinal fluid was normal, and the blood gave a negative Wassermann reaction. There was the most intense spastic paraplegia and considerable incontinence of urine. Distinct but slight loss of sensation of the skin of both lower limbs, especially of the left, and extending on the trunk as high as the costal margin. The level was well defined, posteriorly the anaesthesia reached to the level of the tenth dorsal spine. The loss of sensation included all forms, but was perhaps more obviously a loss to pain and temperature than to touch as tested by cotton-wool. It is important to note that there was a zone of some alteration of sensation in the direction of hypersensibility capping the anaesthesia, and also a slight feeling of constriction (Fig. 1). If the level of the loss of sensation were taken as the guiding line, the site would be in the seventh or eighth segments; if the hyperaesthesia were considered, the affected segment might be the sixth or even the fifth. The abdominal and epigastric reflexes were absent. This might be explained on the assumption of a lesion at the level of the sixth to the eighth segments, but it also directed the attention to the possibility of disseminate sclerosis. There was also a very slight nystagmus, rarely visible unless the eyes were rotated to the extreme right, and then only appearing after the eye had been for a time fixed in this direction. Further, there was myopic astigmatism, with unaided vision of $\frac{6}{24}$. Beyond these, no other signs could be found suggestive of the disseminated lesion. The optic discs, fields of vision, etc., were healthy. Also, the history was not such as is commonly found in this disease. However, considering the protean manifestations of disseminate sclerosis, and the absence of definite pain, it was with some misgiving that I asked my colleague Mr. Monsarrat to expose the cord.

The sixth, seventh, and eighth segments were clearly revealed. On pricking the dura the fluid spurted out a distance of several feet, and on laying bare the cord several opaque strands of tissue were seen between the dura and pia arachnoid. There was certainly no compression, nor could Mr. Monsarrat find anything either by vision or exploration with a probe at the lower part of the incision.

The patient recovered satisfactorily from the operation. I should like to ask, Was this a case of disseminate sclerosis? And, if so, Was the error in diagnosis due to undervaluing the significance of the nystagmus or of the condition of the abdominal reflexes? Or was the site of a compression, for example, of a cystic meningitis, wrongly diagnosed? The uppermost limit of the hyperaesthesia indicated a site as high as the fifth segment; the limit posteriorly of the loss of sensation, namely, at the tenth spine, indicated the seventh segment. Lastly, what is the value of the apparent increase of pressure of the fluid? This seemed so great as to exclude a compression which in any way blocked up the subdural space above the site of the puncture.

I find it still difficult to interpret this case. The extraordinary symptoms of disseminate sclerosis may simulate those produced by many other pathological conditions, yet there may be a danger of too frequently diagnosing this disease. On the other hand, my colleague made so thorough an exploration that it is difficult to understand how any gross lesion could have been overlooked.

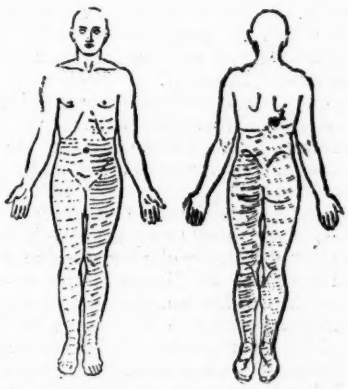

Fig. 1.—No lesion found on operation. Well defined loss of sensation as high as the level of the eighth dorsal segment in front, below this touch (cotton-wool), pain (pin prick) were distinctly diminished. Temperature sensibility, especially to heat, was even more impaired. Above this line on the left side a band of hypaesthesia extended slightly higher. Posteriorly the loss of sensation reached the level of the tenth dorsal spine. Both on the anterior and posterior aspects the loss of sensation was more marked on the left side.

The next case is one of meningeal cyst of the cord.

Mr. R., aged 45, had complained of a stiffness in the left lower limb for about eighteen months; this had increased during the last six months, and the limb noticed to be distinctly weak. Lately at night-time he became aware of "jerkings" and "jumping" of the leg. There had been no pain, though he had constantly experienced a dull aching along the groin of the left side. Mr. R. was a healthy looking man, and no evidence of disease beyond that of the nervous system was obtained. The medical antecedents seemed unexceptional. The cerebro-spinal fluid was normal. Mr. R. was very little incapacitated by his disease, conducting a large business and going about much as usual. In walking a slight but readily discernible drag of the left lower limb was seen, and on testing the various groups of muscles some loss of power fairly equally distributed was discovered.

The knee-jerk on this side was increased, and slight ankle clonus, together with extensor plantar response, were elicited. The functions of the cranial nerve were normal, and nothing pointing to any disseminated disease was discovered beyond a slight complaint of tingling in the fingers of the left hand. The left abdominal and epigastric reflexes were brisk, the right feeble. Cremasterics equal and brisk. Knee-jerk, ankle-jerk, and plantar response on the right side normal. There was a slight hesitancy on micturition, and the testicular sensibility diminished on the right side. The sensory disturbance was important, and its nature is shown in Fig. 2.

The clinical picture was, therefore, one of fairly typical hemilesion of the cord, and this was considered to be at the level of the eighth dorsal segment.

Operation was advised and performed by Mr. Keith W. Monsarrat on February 2nd, 1912. There was a preliminary injection of morphine ½ grain, with scopolamine and atropine of each $\frac{1}{100}$ grain. The fifth dorsal spine was defined and a median incision was made, commencing 2½ in. above this and ending about 4 in. below. The spines of the fifth, sixth, and seventh dorsal were removed and the laminae of the sixth dorsal cut with a saw, the laminae of the fifth dorsal and seventh dorsal being subsequently removed with cutting forceps. The dura was overlain with a gelatinous connective tissue in excess of the normal. When the dura mater was bared a whitish object could be seen moving inside with the pulsations; above this the pulsation was definite, below it no pulsation could be seen. The dura mater was incised above this spot and cerebro-spinal fluid spurted out under marked pressure, although the head was low and the pelvis raised. On opening up the dura the whitish object above referred to was found to be a cyst, with whitish opaque wall and enclosing clear fluid; it was attached to the inner surface of the dura and was connected with septa in the form of thin membranous adhesions between pia arachnoid and dura, which appeared to shut off the subdural space above from the subdural space below, forming a complete partition. The wall of the cyst was removed, the cyst overlaying the cord on its left lateral aspect, and there was visible diminution in the calibre of the cord at this spot. The remainder of the membranous material was stripped off and partly cut away with scissors. The dura mater was then sewn up with a continuous suture of fine silk, the spinal muscles brought together with interrupted catgut stitches, and the skin with a continuous silk stitch. No drainage. The surgical recovery was uneventful and happy.

On February 17th it was noted that the plantar reflex of the left side had changed its character and was often of the flexor type.

On March 1st a full examination of the patient could be made. There was a barely discernible loss of power in the left limb and the disturbance of sensation had greatly diminished, though the same qualitative changes were recognized.

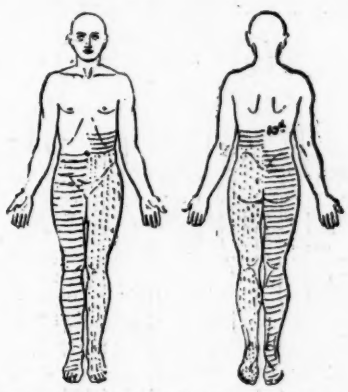

Fig. 2.—Circumscribed arachnoid cyst, showing disturbance of sensation. On the right side marked loss of cutaneous sensibility, especially to pain and temperature. On the left an abnormal "ticklish" sensation elicited on stimulation; vibration sensation diminished. No loss observed in sense of position.

On March 5th the patient left the hospital. He has been seen several times since, remains in excellent general health, the subjective sensations of stiffness have nearly disappeared, and there is practically no incapacity in walking.

The third case is remarkable, both on account of the clinical aspect and for the unusual nature of the lesion, and will be related by Dr. W. Grant McAfee, who was resident officer during the time the patient was in the Northern Hospital, and who has kindly worked up the pathological material.

Dr. W. Grant McAfee (Liverpool) said: This was a case of spastic paraplegia due to a vascular tumour of the lower part of the cord. The patient was a healthy-looking young unmarried woman aged 27. There was an obscure illness ten years ago, from which the patient made a complete recovery. Beyond this no important medical antecedents could be ascertained. Her present illness began some six years ago, with gradually increasing pain across the back at the region of the lumbar spines, and was aggravated by movement. The pain struck down the gluteal region to the hip and was chiefly felt in the left side. It is noteworthy that the anterior aspects of the pelvis and thighs were never the site of pain. Shortly after the onset of pain motor weakness was noticed and this gradually increased. Up to one year ago she was able to walk with assistance, but for the last six months power had been completely lost.

On examination the patient presented the most intense spastic paraplegia, the rigidity being so great that the limbs, when lifted from the bed, remained for a time elevated and interlocked from adductor spasm. Of late jerkings and drawing up of the legs had greatly troubled the patient. Some straining

and difficulty were experienced in emptying the bladder but there was no incontinence. The disturbance of sensation was as indicated in the diagram (Fig. 3). It will be observed that some hypersensibility to touch caps the anaesthesia. The disturbance to temperature recognition was very distinct and sometimes the patient gave paradoxical replies, the cold of ice being experienced as warmth. No other signs of disease of the nervous system could be elicited, the abdominal reflexes were very feeble but could just be obtained. Lumbar puncture and chemical and microscopical examination of the cerebro-spinal fluid showed no abnormality. A compression was diagnosed and the first lumbar segment given as the site of the lesion. Accordingly Mr. Monsarrat exposed the cord at the appropriate place. The cord appeared covered with a congeries of dilated blood vessels encircling it almost as far as its termination. Any attempt to relieve the patient was seen to be impossible and the wound was closed. Unfortunately, intractable vomiting set in and death occurred on the third day.

A full *post-mortem* examination could not be obtained, but the portion of the cord was removed through the surgical wound. On examination of this by the naked eye the conclusion formed at the operation was confirmed; the posterior part of the cord was covered by, and on section appeared to be infiltrated with, a vascular network. Microscopical specimens were prepared and stained by the Weigert-Pal, Van Gieson, and acid orcein methods. Examination of these showed that the growth consisted of dilated veins and comparatively large arteries, showing fibrillation of the elastic laminae and great proliferation of the intima. The etiology of the condition has not been

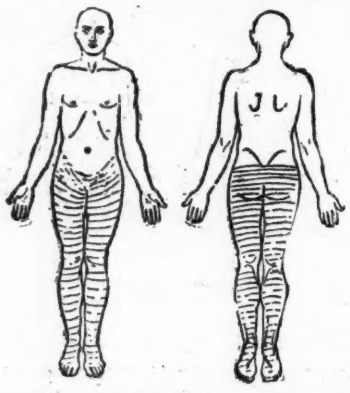


Fig. 3.—Vascular tumour of lower end of cord. Below the level indicated touch (cotton-wool) was recognized. Pain (pin prick) rarely recognized and pressure pain also lost. Recognition of temperature much impaired and paradoxical answers given, "cold" being recoghized as "heat."

determined. Several pathologists have examined the specimen. A specific origin has been suggested.

Dr. GRAINGER STEWART (London) said the subject which Dr. Reynolds and Sir Victor Horsley had opened for discussion was both large and interesting, and he intended to confine his remarks to two aspects of the subject, namely, the differential diagnosis of the various types of compression paraplegia and the distinctions between intramedullary disease and compression of the cord.

The physical signs and symptoms of compression paraplegia arose from involvement of the spinal cord or its surrounding structures, and were determined by the site and nature of the compressing agent. Thus the symptoms might be referred to the spine itself, to the nerve roots, or to the cord or portions thereof. They might be divided into local and remote: the local being due to the direct action of the lesion upon the spine roots or cord, the remote arising from interference with the conducting motor and sensory tracts of the cord. He would like to emphasize the fact that extramedullary compression could give rise to signs of intramedullary lesion, that these signs might be present for months and even years, and yet that removal of the compression might cause their complete disappearance, which showed that in a large number of cases the spinal symptoms were due to interference with the function of the spinal tracts, and not to their destruction.

Taking the meningeal cases first, there were two distinct types of *chronic* leptomeningitis—diffuse and circumscribed. In the *diffuse* cases there was first a slowly progressive but slight spastic weakness of both lower extremities with extensor responses; this was followed later by slight but widespread local signs such as broad girdle sensations and paraesthesia without definite sensory loss, and later still by definite local sensory loss, which became greater than the remote sensory loss if such occurred. The spastic weakness and the sphincter trouble increased. It was typical of these cases that the superficial abdominal reflexes were obtainable long after the development of typical extensor plantar responses.

In the *circumscribed* cases the upper level of the compression was more definite, and developed earlier, though relatively not so rapidly as in cases of tumour. The cord was either compressed by thickening of the membranes or by the damming-up of cerebro-spinal fluid owing to adhesions between the leptomeninges and pachymeninges; in the latter case the membranes were distended above the constriction, and the cord did not pulsate below that level, although in many cases incision of the membranes was followed immediately by the restoration of pulsation in the cord—a sign which was of good prognostic significance. In cases of so-called arachnoid cyst cerebro-spinal fluid was collected to form a local cyst within or under the arachnoid. In these cases the clinical symptoms were often more like those of tumours, but complicated by being bilateral at an early stage. *Chronic pachymeningitis* was commonly syphilitic, but sometimes tuberculous. The lesion was often confined to one side, giving rise to early and intense local root symptoms, followed by signs of compression of the corresponding side of the cord. Eventually the cord was surrounded, both root and spinal symptoms becoming bilateral.

*Intradural Spinal Tumours.*—These might be divided into two classes: (1) Firm circumscribed tumours; (2) softer and not circumscribed. In the former the tumour was generally round in transverse section and spindle-shaped in longitudinal section, lying parallel to the long axis of the cord. The clinical picture was very constant and typical, first root symptoms on one side—if the roots were involved—followed later by the progressive onset of signs of unilateral pressure on the cord, the motor weakness being on the side of the tumour; the sensory loss on the opposite side extending to a level three to five segments below that of the compression. The sensory loss usually followed the motor loss, but sometimes preceded it. Later signs of bilateral compression developed, one of the earliest being the onset of sphincter trouble and bilateral spastic weakness. When this had lasted for some time the sensory loss became bilateral, and then extended almost up to the level of the compression. If the roots were not affected, the nature and seat of the growth must be inferred from the mode of development of the physical signs.

Soft non-circumscribed growths spread rapidly to surround the cord, and there was no long interval between the onset of root or unilateral cord symptoms and the development of bilateral cord symptoms. These cases progressed rapidly and soon became completely paralysed.

*Dural and Extradural Tumours.*—Where the tumour was attached to the dura it simulated closely intradural tumours arising from the nerve roots. Tumours which merely pressed upon the dura did not produce cord symptoms until a late period, and when they commenced they were bilateral and intense. The explanation of this was found in the sudden compression of the cord between the tumour and the opposite side of the bony canal. This might also account for the relatively severe degeneration of the cord on the aspect furthest from the tumour.

*Caries and Vertebral Tumours.*—In these cases the earliest symptoms were as a rule referred to the bone, and even when this was not the case movement of or pressure on the affected portion of the spine aggravated or caused local or root pain.

The diagnosis between compression paraplegia and other forms of nervous disease could only be made by the recognition of the signs of involvement of the spine and nerve roots as evidence of an extramedullary lesion, and, failing these signs, by the accurate observation of the mode of onset of the symptoms and the absence of signs indicative of some general nervous affection. He would not take the presence of nystagmus as negativing a diagnosis of spinal tumour, as he had noted its occurrence in five cases of spinal tumour, in two of which it led to delay in the recognition of their

true nature. They were at first diagnosed as cases of disseminated sclerosis.

It was abundantly proved that extramedullary pressure might cause signs of intramedullary lesion, that these signs might persist for months or years, and yet completely disappear as the result of removal of the compression.

Dr. F. E. Batten (London) said he intended to deal only with one point—namely, the presence of thermo-anaesthesia in spinal lesions and its value in the diagnosis between intra- and extra-medullary tumours of the spinal cord. The presence of thermo-anaesthesia, either in the form of complete thermo-anaesthesia below the level of the lesion or in the form of a Brown-Séquard paraplegia, would suggest that the lesion had an intra- and not an extra-medullary situation. The former was an inoperable, the latter an operable, condition. The point could best be illustrated by reference to two cases, the former that of a young man who complained of weakness and wasting of the small muscles of both hands, with gradually increasing weakness of arms and legs. He had thermo-anaesthesia below the cervical region, and signs of pressure on the pyramids. He had little or no pain. Such a symptom-complex suggested a syringomyelia or central gliomatosis. He was treated with antisyphilitic remedies without success. The patient was then told that the cause of his trouble was probably situated within the spinal cord, and under these circumstances operation could do no good. The patient wished to take the chance of operation. A condition of pachymeningitis was found, and the man made a fair though not complete recovery. The growth in this case was said to be an endothelioma. The second case was that of a man with a Brown-Séquard paralysis of gradual onset below the level of the seventh thoracic segment. He complained of no pain. The loss of sensation on the affected side was limited to the appreciation of heat, cold, and pain. The question of an intra- and extra-medullary lesion was raised. Mr. Sargent performed a laminectomy, and a tumour was found at the level of the sixth thoracic root. The speaker expressed the opinion that thermo-anaesthesia could be used as a diagnostic point between intra- and extra-medullary lesions. He entirely disagreed with Sir Victor Horsley, who had expressed the opinion that all cases of paraplegia due to spinal caries should be operated upon. He considered that such cases should never be operated on.

Sir Victor Horsley, in reply, said that the children treated by rest were not cured, and that the disease would relapse later in life. Operation gave good, not bad, results.

## TUMOUR OF THE ANTERIOR PART OF CORPUS CALLOSUM EXTENDING INTO THE LEFT FRONTAL LOBE: MOTOR APRAXIA.

By J. Michell Clarke, M.A., M.D., LL.D., F.R.C.P.,
Professor of Medicine, University of Bristol; Physician to Bristol General Hospital.

The patient was a pilot, aged 53. Fourteen years previously he had been laid up for six or seven months with an indefinite illness, non-febrile, and attributed to overwork; for a part of this time he was "not quite right in his head."

In May, 1909, he was taking a ship out of dock, when the mate failed to carry out his orders, and the nervous apprehension of an accident brought on a feeling of "gurgling," or "twitching" in his throat, with great shortness of breath. From the description of those near him he appeared to have difficulty in speaking, could not give his orders properly, hesitated and stammered. No muscular twitchings, giddiness, or loss of consciousness occurred; he recovered quickly, and took the ship across the Bristol Channel. Similar attacks, on each occasion caused by excitement, had occurred six months and three years previously. In June, 1909, I saw him first, and found no evidence of organic disease; the optic discs were normal; except for a slight trace of albumen in the urine he seemed perfectly healthy. Speech was normal, and there was no affection of the larynx, nor of the lips or tongue.

Until April, 1910, he seemed quite well, and was actively at work; at this date he was found one day, whilst at Milford Haven, lying in his bunk unconscious, and was taken to the hospital. On recovering consciousness he had right hemiplegia, from which he recovered in about six weeks, but from this time he complained of defective vision in the right eye. There was no squint.

In June, 1910, he was at home, able to work and to spend most of his time outdoors. He now first suffered from very severe headaches, generally localized to the right fronto-parietal region; they were unaccompanied by vomiting. These attacks of headache continued during the rest of the illness.

In August, 1910, on account of progressive failure of sight, he saw Mr. Richardson Cross, who found double optic neuritis, with much swelling of the discs, most intense in the right eye.

In November, 1910, he had an epileptic fit, followed by several epileptiform attacks, mostly slight, and lasting about ten minutes. The convulsions began on the right side, became general, and were followed by temporary loss of speech and tremor of the limbs.

In December, 1910, whilst out walking, he suddenly lost power in his right leg and fell; there was no loss of consciousness. After this he did not leave the house; the right leg never regained full power, and the left leg shortly afterwards became weak so that he could not walk.

In January, 1911, he took to his bed. He could just manage to stand and to walk a few steps with help. Since June, 1910, the mental condition had slowly deteriorated, although there were intervals in which it was almost normal. He became dull, apathetic, drowsy, forgetful, and neglectful of his dress and appearance. At times he would lie in bed in a stuporous state, taking no notice of his surroundings. At other times, though not stuporous, he was disorientated as to time and place, and did not recognize his children.

On February 11th, 1911, I saw him for the second time; he had then been lying in semi-stupor for three weeks. He replied to questions, but was soon fatigued.

On February 20th he was admitted to the Bristol General Hospital.

*State on Admission.*

He looked fairly healthy, but had a peculiar expression—a "puzzled" look on his face. Pulse rate 88, respiration 20, temperature 97.4°. Tongue moist, furred, slightly tremulous. Thoracic and abdominal organs normal; the urine contained a trace of albumen. On admission there was no loss of control of the sphincters. He could not stand or walk, but could just sit in a chair if supported. The mental condition was one of dullness and apathy, with great defect of memory. He had practically no memory of any events since the seizure in 1911. He was disorientated as to place, thinking he was in the Milford Hospital; sometimes he thought he had been to his home that day. He constantly mistook persons in the ward for his own relatives, but recognized his daughter when she came to see him. He had no power of sustained attention. On the other hand, he answered questions with fair intelligence, although very slowly. His defective vision must also be borne in mind. Sometimes he would count numbers or sing to himself for half an hour. He was never jocular.

*Eye Symptoms.*

Vision was nil in the right eye, and little more than perception of light in the left. Double optic neuritis, with much swelling of and around the discs; no haemorrhages. The right disc showed commencing atrophic changes. Pupils equal, dilated, reacted to light; the left did not react to accommodation. No squint; no nystagmus.

Other special senses normal.

No paralysis of the facial, lingual, palatal, or laryngea muscles. Speech slow but quite distinct. Swallowing normal.

*Limbs.*

The legs could be moved in bed; they were paretic, but not absolutely paralysed. The movements possible were not ataxic. The legs were very rigid, and the spasm could not be relaxed. The sense of position was not lost. The arms were weak, but not paralysed. At times he was constantly moving his hands and arms in an irregular fashion or picking at the bedclothes. All the movements of the upper limbs were clumsy and awkward, so that he could not be trusted to feed himself, but there was no true ataxia. On movement a fine tremor of both arms was noticed.

After some days' observation it was quite obvious that although he could move the left arm and hand, he never attempted to use them; for instance, he never employed the left hand when he tried to feed himself, and this drew attention to the marked condition of apraxia in this limb. With the right hand he could on command do such actions as opening a matchbox and taking out the matches, or opening a penknife. Any such action was impossible with the left. He could not carry out any simple movement requested of him with this hand, and the request only resulted in his waving the limb about in an indefinite way, the same motion being repeated whatever he might have been asked to do. This repetition of the movements was striking. Sometimes he appeared to be satisfied that he had thus carried out the movement required of him, but more often he tried to supplement the left by the right hand; in fact, the way in which he tried to help the left hand with the right was a striking feature. After carrying out an action with the right hand he could not repeat it with the left. He could recognize common objects simply by contact when they were placed in his right, but very rarely when placed in his left hand, but if he once succeeded in thus recognizing an object, he called all succeeding ones by the same name. There was no affection of

common sensation to touch, prick, or thermal stimuli on either hand or arm, and it may be said here that sensation appeared to be unaffected everywhere over the body.

It may be objected that in the man's dull mental state the above observations could not be accurately made, but favourable moments were seized, and great care taken by doing only a few tests at one time not to fatigue him, so that I think the above statements are correct, especially as the apraxia of the left was in marked contrast to its absence in the right arm.

*Reflexes*

Deep reflexes increased in both upper extremities; knee-jerks both exaggerated, especially the right. Double ankle clonus. Abdominal and cremasteric reflexes present on both sides.

Plantar reflex extensor on right, flexor or indefinite on left side. Lumbar puncture showed the cerebro-spinal fluid to be under considerable pressure. The fluid was clear and normal in all respects. Noguchi's and Fleming's tests negative. For a few days after the puncture his mental condition improved, but on March 2nd he was decidedly worse, and incontinence of urine appeared. The diagnosis was made of a tumour in the corpus callosum and left frontal lobe.

*Decompression Operation.*

On March 3rd a decompression operation was done with the object of relieving the headaches, preserving the remnant of sight, or possibly ameliorating this and the mental condition. He vomited several times after the operation, but made a good recovery from it. The operation made no alteration in his condition. He grew worse very gradually, and died on April 3rd.

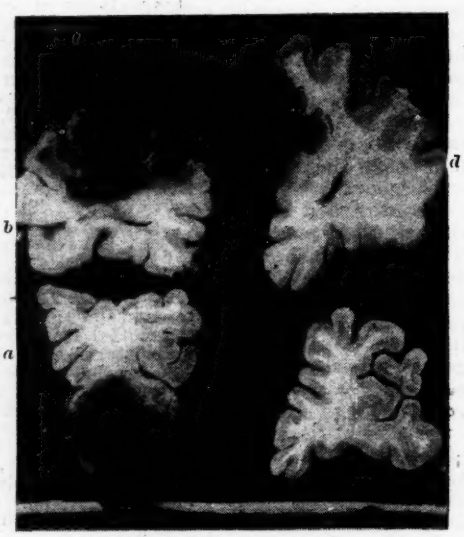


Fig. 1.—Vertical sections through frontal lobes. *a*, Through anterior part of left frontal lobe showing anterior extremity of large cyst; this section is inverted. *b*, A little further back, showing the same cystic cavity, which here compresses and destroys left superior frontal gyrus, and also on inner side damages callosal and marginal gyri The small slit in centre of white matter below cyst is the tip of anterior horn of lateral ventricle *c*, *d*, Right frontal lobe normal.

*Post mortem* a large tumour was found originating in the anterior part of the corpus callosum, and extending into the left frontal lobe. The tumour had destroyed and replaced the genu of the corpus callosum, and also the fibres which pass into the left frontal lobe and prefrontal area (forceps minor); the corresponding fibres passing into the right frontal area were somewhat compressed, but not destroyed by the tumour. In addition there was a large cyst in the white centre of the left frontal lobe, which also destroyed the fibres passing to and from the cortex of the left prefrontal area, and at its posterior part an area of softening interrupted the fibres passing from the left cortical leg centres to the internal capsule.

Passing from before backwards, in a section through the anterior part of the frontal lobe (Fig 1), about 1 in. behind the anterior pole, a large cyst in its outer part underlies and cuts off the connexions of the superior frontal, marginal and tip of callosal convolutions (limbic lobe).

A little further back (Fig. 2) the cyst, occupying the centre of the left frontal lobe, cuts off the frontal convolutions subcortically. The main tumour forms a large mass lying above the genu of the corpus callosum between the frontal lobes, and on the left side the callosal and most of the marginal gyri are destroyed. Behind this the tumour replaces the body of the corpus callosum, spreading laterally by the forceps minor along the internal superior wall of the anterior horn of the lateral ventricle; also into the callosal gyri, more especially on the left side. The cyst is smaller, but cuts off the superior frontal gyri, and below an area of oedematous and softened brain lying subcortically to the middle and inferior frontal gyri must have greatly damaged and interrupted the fibres proceeding from them. Broca's convolution and its subcortical connexions were outside the limits of the diseased parts. Still further back (Fig, 3) the posterior extremity of the cyst appears still in the white matter of the superior frontal convolutions, and well in front of the precentral gyrus. The tumour mass in the corpus callosum is now smaller, and extends downwards into the body of the fornix, especially on the left side.

Behind this the smaller posterior end of the tumour is entirely in the fibres of the corpus callosum passing into the left hemisphere, and a patch of softening just external to it interrupts the fibres passing from the cortical leg centres to the internal capsule.

This case, then, adds another to the list in which motor apraxia has been found in tumours of the corpus callosum. In Dr. Wilson's excellent paper on the subject[1] will be found several cases of lesions of the corpus callosum and frontal lobes in which this symptom occurred. The points to which he particularly draws attention in the conclusion of his paper are (1) that apraxia has been proved sometimes to be unilateral; (2) that it is much more frequently associated with lesions in the left hemisphere; (3) the significance of disease of the corpus callosum in the development of apraxia, especially where the apraxia is homolateral; (4) its occurrence when the whole of the cortex of both hemispheres has been normal, with the exception of the left frontal area.

Fig. 2.—Vertical section through anterior commissure. Shows the large, rounded tumour growing from germ of corpus callosum upwards. To its left is the continuation of the cystic cavity seen in Fig. 1; it is contained in white matter of left frontal lobe. Below the tumour is the anterior commissure. S.F., M.F., I.F.—Superior, middle, and inferior frontal gyri. "Callosal marginal" points to these gyri on left side compressed between tumour and cyst. Genu: Genu of corpus callosum. T.S.: Tip of temporo-sphenoidal lobe. The tumour presses upon, but does not infiltrate, right frontal lobe, nor destroy fibres issuing from it.

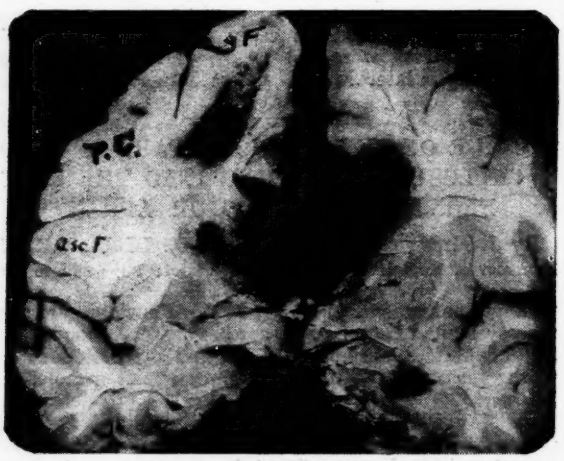


Fig. 3.—Vertical section further back shows above and to left posterior extremity of cyst; a patch of softening below it (not shown in this figure) interrupted course of fibres from cortical leg centres. The tumour has destroyed and replaced the corpus callosum. Below the tumour on the left is seen the internal capsule, not damaged, on the right the fornix, and directly below septum lucidum. S.F.: Superior frontal gyrus. Asc.F.: Ascending frontal gyrus.

Subsequently to his paper there is Dr. Tooth's case of tumour of the mesial half of the left frontal lobe and of the genu and anterior half of the corpus callosum, in which there were paresis, slight spasticity, and some apraxia of the left arm.[2] A case is reported by Liepmann and Maas[3] in which there was apraxia of the left arm and hand with perseveration and right hemiplegia. A large area of softening involved the white matter under the frontal gyri, gyrus fornicatus, and paracentral lobule, and especially the left half of the corpus callosum in the anterior three-quarters of its extent, as well as its area of origin in the left hemisphere. The right hemiplegia was due to a separate lesion in the pons.

In Goldstein's case[4] there was well marked left-sided motor apraxia; an area of softening involved the corpus callosum in its whole extent, and also the following parts of the *right* hemisphere: the white matter and part of cortex of paracentral lobule, the white matter and all cortex of gyrus fornicatus and posterior portion of mesial cortex of superior frontal convolution. In the abstract it is not stated whether this patient was right or left handed.

It would seem, then, that motor apraxia is a valuable localizing sign of tumours or lesions of the corpus callosum. The inference will be certain if the motor apraxia follows or accompanies the hitherto recognized signs of a tumour of the corpus callosum—that is to say, gradually developed hemiplegia, first on one side of the body and then on the other, affecting the legs more than the arms, with sometimes a rapid loss of vision unaccounted for by the degree of optic neuritis present, or the delayed appearance of optic neuritis, and, at some time in the progress of the case, mental disturbance. If, as is held by many authorities, the cortex of the first and second frontal convolutions has a guiding and controlling and co-ordinating influence over general movements, as the left third frontal convolution has over the movements of speech, then it will be in lesions of the genu of the corpus callosum and of the fibres spreading thence into the left frontal lobe that we shall expect to find motor apraxia especially well marked. The evidence so far points to this being the case, but at the same time motor apraxia may be produced by lesions in other than the frontal lobes and corpus collosum; thus Kroll[5] reports three cases of motor apraxia in which the frontal lobes appeared macroscopically healthy, but pathological lesions were found in the supramarginal gyrus, and he accordingly ascribes the symptom to lesions of the white matter of this gyrus. The value of motor apraxia in the diagnosis of lesions of the corpus callosum at present lies in its association with other signs pointing in the same direction. As the diagnosis of such a lesion is often very difficult, so definite an additional sign is a valuable aid.

In the case above related the cyst in the left frontal lobe was of haemorrhagic origin. The attack of apoplexy followed by right hemiplegia was probably due to a large haemorrhage into this lobe, the apoplectic focus being subsequently converted into a cyst. The leg was predominately affected because the cortical leg centres were cut off from their subcortical tracts, whilst the tract from the cortical arm and face centres lay posteriorly to the lesion. To sum up: The chief points in this case are the long history, the apoplectic seizure followed by right hemiplegia, with regain of power in the arm, but leaving the leg paralysed; the subsequent paralysis of the left leg, the signs of affection of both pyramidal tracts, the late occurrence of optic neuritis; the loss of sight in relation to optic neuritis, which was neither very acute nor showed marked atrophic changes; the peculiar mental condition of drowsiness, apathy, and disorientation; and the motor apraxia and perseveration, together with the absence of disorders of sensation.

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[1] Contribution to the Study of Apraxia. *Brain*, vol. xxxi, 1908, p. 164 reg. [2] *Rev. Neurol. and Psych.*, vol. vii, 1909, p. 975. [3] Ibid., vol. vii, 1909, p. 116. [4] *Neurol. Centralbl.*, 1907, p. 898. [5] Abs. in *Jahresb. d. Neurol. u. Psych.*, xiv, 1911, p. 388.

## THE NATURE AND TREATMENT OF EPILEPSY.

By William Alexander, M.D., F.R.C.S.

I have been requested to describe my views of the nature and treatment of epilepsy. In complying it will be necessary to treat the subject in outline rather than in detail, owing to the shortness of the time at my disposal.

By epilepsy I mean the so-called essential epilepsy where the fits are the only evidence of defect. Hemiplegics, imbeciles, idiots, feeble-minded people, and lunatics may also have fits, but the fits are not the main disease, and although the fits may be arrested the major disease remains. An imbecile boy has had his fits arrested for eight years, but remains an imbecile. An idiot has had the fits reduced to a small number compared with the daily attacks he formerly suffered from, but his brain is degenerating and his habits are becoming more and more depraved.

An intelligent, open-hearted, and lovable girl had recurrent attacks of mania accompanied by violence. Her epileptic attacks became less frequent, but her attacks of mania increased in number, and she had to be sent to an asylum. Some would call her mental attacks "psychic equivalents"; I would prefer to look upon them as evidence of insanity, and I base my opinion on the ground that epilepsy can be arrested and the other disease remains. I am not concerned with any of these cases to-day.

In the beginning all sorts of patients were sent to our homes at Maghull, provided that they suffered from "fits."

When we learnt that we could arrest the epilepsy, but that the complications remained and made our work of no practical value, we had to revise our position, and we now only retain patients who, except for the epileptic manifestations, are able to take their place in the struggle for existence.

Epilepsy, then, is the result of a *condition, probably a circulatory disturbance, often accompanying* the diseases I have named, but a condition capable also of being produced by trauma and by many obscure causes, and in all these cases the epilepsy is capable of arrest. For instance, in 23 hemiplegics the attacks were arrested in 2 cases, or 8.6 per cent. In 25 imbeciles the attacks were arrested in 3 cases, or 12 per cent. In 174 healthy children the attacks were arrested in 29 cases, or 16.6 per cent. As we would expect, otherwise healthy epileptic children are more successfully treated than otherwise defective epileptic children, but we need never despair of some success in arresting the attacks even in the most hopeless cases.

*Malnutrition of the Grey Matter of the Encephalon.*—I need not remind my hearers of the popular theory that attributes epilepsy to the malnutrition of the cortical cells of the grey matter of the cerebrum. I want to make a suggestion in regard to the malnutrition. For about ten years I have been much impressed during my exploratory operations on epilepsy with the constant presence of oedema of the pia arachnoid. The fluid is clear and somewhat flocculent, and varies in quantity from speckled white streaks that accompany the vessels to a layer of such a depth as to conceal completely from the sight of the operator the cerebral convolutions.

In focal epilepsy the oedema is most marked at the focus of the disease. In non-focal epilepsy it is distributed more or less unequally over the motor area on both sides of the brain.

The fluid lies enmeshed in the pia and visceral arachnoid, so that the cortical brain cells live, as it were, in a marsh, and a consequent malnutrition of the cortical cells that spells epilepsy may be due to this condition. In a paper in the *Lancet* of September 30th, 1911, I have dealt with the matter at more length than is possible here, and to that paper I would refer any who wish to pursue the subject.

*Precipitin Reaction in Epilepsy.*—Recently Dr. D. M. Alexander, Assistant Superintending Medical Officer at Maghull, has discovered a reaction produced by a precipitin evoked by some substance present in epileptic body fluids but not in normal human serum. We do not know to what this clue may lead. A preliminary note on the matter will be found in the *Liverpool Medico-Chirurgical Journal* for July, 1912.

*Treatment of Epilepsy.*—The treatment of epilepsy must be early, continuous, and persistent for several years, and all the more if the attacks become arrested. It is during the periods of arrest that in the past valuable time has been lost. When attacks have ceased for only a few weeks means of treatment are generally abandoned, often directly against medical advice, in the false belief that a cure has been effected; and when a recurrence takes place it is supposed that previous treatment has failed, and consequently patients and friends seek other advisers. Finally, after a number of similar

episodes, resort to quacks takes place, and when they fail colonies receive the victims of ignorance and mistreatment. As showing the chronicity of the disease, 158 of our cases had trodden the *via dolorosa* of epilepsy for twenty years and upwards before they applied for admission to our homes, 281 had been ill for ten to twenty years, 224 had been ill for five to ten years, and only 60 had been admitted in the first year of their illness. In 24 cases the previous duration of the disease was unknown. Out of all these chronic cases the disease had been arrested in 92 for varying periods ranging from three months to seventeen years, as ascertained from an examination of our records in May last.

*Effects of Early Treatment on the Results.*—Where the disease had not existed for more than ten years the arrests amounted to 12 per cent.; whilst in those cases where the disease had existed for upwards of ten years the "arrests" were only 8 per cent.

Patients admitted within a year of the commencement of the disease had the fits arrested in as many as 15 per cent. of the cases. (The arrests in all the cases since the establishment of the homes are just under 10 per cent.)

If we exclude all arrests under a year we have the following successful results:

| | | | | | |
|---|---|---|---|---|---|
| Disease arrested for | 12 | months | ... | ... | 16 cases. |
| ,, ,, | 18 | ,, | ... | ... | 7 ,, |
| ,, ,, | 2 | years | ... | ... | 13 ,, |
| ,, ,, | 3 | ,, | ... | ... | 12 ,, |
| ,, ,, | 4 | ,, | ... | ... | 1 case. |
| ,, ,, | 5 | ,, | ... | ... | 6 cases. |
| ,, ,, | 6 | ,, | ... | ... | 1 case. |
| ,, ,, | 7 | ,, | ... | ... | 6 cases. |
| ,, ,, | 8 | ,, | ... | ... | 2 ,, |
| ,, ,, | 17 | ,, | ... | ... | 1 case. |

The treatment consists, broadly speaking, in enabling the patients to lead a normal life during the intervals of their attacks, to continue their education if of school age, to acquire and work at a suitable occupation if beyond the school age, to be restored to the society of their equals, and to secure liberty and independence of thought and of action as far as is consistent with safety; and the amount of liberty a patient in a colony has is absolute freedom compared with the restrictions on a patient's liberty even in the most sympathetic family circle.

*A normal life* means at Maghull a mixed diet, in which meat only occurs once a day, and then in moderate quantity, with fruits and vegetables in their season. Three meals a day, and a light supper of gruel, bread and milk if desired by the patients. Matutinal attacks are treated by some simple diet before arising from bed. Tea, coffee, and cocoa are allowed in a very weak form. Tobacco and alcohol are not allowed. Plenty of sleep—eight to nine hours—is allowed, but sloth is not encouraged.

*Occupation.*—Every patient works at something on the farm or in the gardens, the joiner's shop, the smithy, or the wood shed, basket making, looking after the cattle and the poultry. The women have laundry work, cooking, housemaid's work, and needlework.

The number of hours engaged in work by each individual is read out on Saturdays, and is treated as a matter of importance, so as to encourage the industrious and stimulate the lazy. Those who learn to work steadily and can be relied upon receive small gratuities occasionally, by which they can buy a new article of dress, or subscribe to the football, tennis, or cricket clubs.

*Sports.*—Their sports are managed by committees elected by themselves. Both as regards work and play, our object is to arouse individual interest and personal endeavour, and to restore to patients such a look of intelligence and thought as can be seen on the face of an ordinary normal individual who is pursuing some business or occupation.

We do not encourage introspection or analysis of symptoms, but endeavour to turn the attention to outside matters unconnected with the disease.

*Education of Epileptics.*—This is a most important item in the treatment of the disease. As a rule, when epilepsy appears education ceases, not only as regards the acquirement of the three "R's," but also in regard to self-control and self-culture, etc. Now this, I think, is a great mistake. If the patient is an essential epileptic, nothing but good can arise from a judicious amount of mental work, and the acquirement of the three "R's" can be successfully pursued, although the time occupied in their acquirement may be a little greater than usual. More personal effort is necessary on the part of the teacher, but with patience and skill the results of the literary education of epileptics is gratifying.

Mechanical work, nature studies, drill, are useful agents in training epileptics as well as other children, but it is very necessary that the three "R's" should be acquired if the scholars are to be of any use in actual life. If a child cannot read, write, and do some arithmetic, how can he learn to be a joiner—to make estimates, or to translate plans into constructive work? I think you will all say that this is reasonable and necessary, but I am forced to insist on this part of the education of epileptic children, on account of the tendency of education authorities and education inspectors to treat epileptic patients as feeble-minded and not to trouble about their literary education. The teachers are very glad to follow their lead, as it is much easier to keep the children occupied with bead threading, daubing with colours, puddling with clay, and the other hundred and one occupations invented by teachers for occupying the minds of infants and imbeciles.

The system in vogue of educating the feeble-minded is not suitable for sane epileptics. What we want is the normal system of teaching healthy individuals modified to meet the exigencies of the attacks.

*Medicines.*—A long experience of the treatment of epilepsy convinces me that we cannot depend entirely on hygienic treatment of the disease. A carefully arranged medicinal treatment will increase the number of arrests of the fits in a very material degree. Potassium bromide I never use as a routine treatment. It is a very necessary and powerful agent for crises, and we could not well do without it; but if constantly used in the large doses commonly prescribed, there is in my mind no doubt of its baneful influence on the mind and brain. The routine medicine at Maghull, where such is considered necessary, is borax and sodium bromide. The maximum dose of each is 20 grains three times a day given in barley water. We have tested most of the compounds of bromide that have been recommended, and we do not find any to come up to the success of our own mixture supplemented as it is by a normal healthy life.

*Treatment in Private Practice.*—As a general rule the only part of the colony treatment that is understood and that can be carried out in private practice is the medicinal treatment. Relatives will attend to the distribution of medicine, but the other conditions, even when they are understood, which they often are not, cannot be carried out. And even the medicine, owing to many adverse influences, ceases to be given if the fits cease to occur. Again and again have private patients come back to me after a long cessation of attacks complaining that the fits had returned, and almost invariably I found that the administration of medicine had ceased or become so irregular as to be ineffective.

The operation of draining the cerebral oedema or "fenestration of the dura mater" has been performed by me in a number of cases; these are recorded in the *Lancet*, September 30th, 1911, before referred to. It will be seen from a perusal of that paper that a large number of patients were benefited very much. The operation is undertaken in focal cases, and in such cases where, as often happens, no tumour or gross lesion presents itself, and I think the operation of fenestration should be performed wherever oedema is present and where from the absence of a lesion nothing else can be done.

My experience leads me to the conclusion that when the treatment of epilepsy is carried on as I have described above, the outlook of an epileptic will become much brighter and more hopeful than it has been in the past.

## DISCUSSION.

Dr. Batten (London) said that he agreed entirely with the line of treatment advocated by Dr. Alexander, and he hoped the time would soon come when institutions such as Maghull would be available for the treatment of epileptics in other parts of the country. He thought that the use of bromides was of the greatest value in dealing with epilepsy, and no harm resulted from the use of that drug. It was the abuse of the drug which did harm. He asked Dr. Alexander if he had examined the fluid from the oedematous areas which he found on operation. The

speaker was not in favour of operation in the treatment of epilepsy, though he admitted the diminution in the number of fits might occur as the immediate result of the operation.

Dr. Warrington (Liverpool) considered that treatment by bromides, combined with other medicines, was most useful. He often gave digitalis with bromide. Was there definite evidence that the potassium, as contrasted with the sodium salt, was injurious? He had always felt that the great difficulties in the study of the pathology of this disease were the secondary changes that must occur after the profound disturbances following epileptic discharges and the facts of inheritance. Who had any knowledge of the brain of a potential epileptic?

Dr. Blair (Lancaster) deprecated Dr. Alexander's separation of sane and insane epileptics.

Dr. Michell Clarke (Bristol) expressed his appreciation of Dr. Alexander's work and interest in his paper. He asked as to what experience he had had as to the effect of the elimination of salt from the dietary. He was interested to hear that Dr. Alexander allowed his patients meat once a day; he himself thought that patients did best with less meat than this; a certain number also were improved by being placed on a so far as possible purin-free diet for a time. As to bromides, he agreed with what had been said by Dr. Batten—treatment by bromides was most effectual when begun early after the appearance of the first fits, and should be then continued steadily; after the fits had lasted for some time it was less effectual. Recently he had found benefit from addition of small doses of pilocarpine to the bromide. He hoped that the movement which was now spreading throughout the country for the segregation of the feeble-minded would also embrace an adequate provision for the care and education of epileptics in country colonies.

Dr. Charles Williams (Chester) quite agreed with Dr. Alexander as to the value of the operation of fenestration of the dura mater in cases of intractable epilepsy, and related a case operated on by Dr. Alexander a few years ago when the patient (a little girl of 7) had thirty or forty fits per diem. After the first operation on one side the fits decreased to half that number, and after the second operation they ceased altogether.

The President (Dr. Oswald), in summing up the discussion, gave it as his opinion that bromide induced mental reduction but was useful in chronic cases.

## ON THE USE OF BRAIN EXTRACT IN THE TREATMENT OF VARIOUS FORMS OF INSANITY.

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The earlier observations were made after the administration of an extract prepared from the brains of fetal calves. The results were so pronounced, but the supply of such material so limited, that the experiments were continued with extracts prepared from the brains of healthy full-grown sheep and cattle.

### *Preparation.*

The extract is prepared by boiling finely divided brain tissue in a mixture of alcohol and ether for a lengthened period, then straining through fine muslin. When perfectly cold the supernatant fluid is decanted from the thick, heavy deposit. This deposit is carefully poured into boiling normal saline solution to which glycerine has been added. Experience has shown that 30 c.cm. of the deposit, when added to 1,000 c.cm. of the boiling salt solution, forms an opalescent emulsion with practically no sediment. It is free of alcohol and pleasant to the taste.

The chief points so far noted are: (1) That the extract must be made as soon as possible after the animal is killed—delay renders the preparation almost valueless; (2) the younger the animals are, the greater is the therapeutic effect of the extract; (3) the thick white fluid obtained after the tissue has been boiled and strained keeps for a lengthened period, and can be added to the saline solution as required.

The emulsion is rich in cholesterin and in a substance which reduces Fehling's solution. It was originally prepared to obviate the great expense entailed in using cholesterin on a large scale. It appears to have advantages over this substance both in administration and action. It also appears to have a more potent effect than the dried preparations sold under the name of "cerebrin."

It is of the utmost importance to find some substitute for the hypnotics and sedatives at present in common use. Useful as such drugs of the sulphonal, chloral, and bromide families are, their administration over any length of time is attended with such serious secondary effects on the nutrition and mental state that any remedy which promises to give the sedative effect without the concomitant impairment of nutrition merits a wide trial. This can be claimed for the present preparation.

### *Cases Treated.*

1. *Chronic.*—The cases which form the majority of those treated during the past eight months are those of the chronic forms of excitement and depravity of habits, on whom the usual tonic and sedative methods had been tried without inducing more than a temporary quiescence; others belong to the chronic insane who are liable to outbursts of extreme violence as the result of delusional and hallucinatory excitation. A third group under treatment are the chronic epileptics.

2. *Recent.*—Amongst the cases of recent insanity which have undergone treatment are those suffering from dementia praecox, confusional insanity, and melancholia.

I propose taking seriatim the various groups of cases treated, and mentioning the chief features noted about each.

### A. *Dementia.*

Of these 12 female cases of secondary dementia only 1 is a recent admission, and she has shown the most decided alteration in the mental symptoms. When admitted last month she was completely disorientated, unable to understand what was said to her, usually mumbled when spoken

*Dementia.*

| No. | Admitted. | Age | Date of Treatment. | Weight. | Result. |
|---|---|---|---|---|---|
| 1 | May 18, 1909 | 60 | June 17, 1912 | May, 8 st. 1 lb.<br>July, 7 st. 12 lb. | Not improved. |
| 2 | July 12, 1907 | 40 | June 17, 1912 | July, 5 st. 9 lb. | Not improved: patient suffering from chronic phthisis. |
| 3 | April 5, 1910 | 45 | June 24, 1912 | July 6, 8 st. 10 lb.<br>July 17, 9 st. 8 lb. | General health greatly improved; mental health improved. |
| 4 | July 29, 1908 | 49 | June 24, 1912 | June, 6 st. 11½ lb.<br>July, 7 st. 1 lb. | Mental state improved; physical health improved; persistent boils recovered from. |
| 5 | May 5, 1908 | 34 | Mar. 21, 1912 | Feb., 7 st. 0½ lb.<br>May, 7 st. 6 lb.<br>July, 9 st. 0 lb. | Emaciation and extreme mindlessness; great improvement mentally and physically. |
| 6 | Nov. 15, 1911 | 62 | June 5, 1912 | June, 7 st. 6½ lb.<br>July, 7 st. 0 lb. | Old-standing case of mania with supervening dementia; mental state greatly improved. |
| 7 | Nov. 15, 1911 | 69 | June 8, 1912 | June, 9 st. 13 lb.<br>July, 8 st. 11 lb. | Persistent eczema of trunk and arms; recovery. |
| 8 | July 4, 1907 | 39 | April 2, 1912 | April, 8 st. 2 lb.<br>May, 8 st. 4 lb.<br>July, 7 st. 12 lb. | Impulses to violence; improved. |
| 9 | Nov. 15, 1911 | 71 | June 23, 1912 | June, 7 st. 12 lb.<br>July, 7 st. 11 lb. | Much improved. |
| 10 | June 5, 1912 | 62 | June 10, 1912 | Not taken | Chronic mania of 30 years' duration: improved for a time |
| 11 | Nov. 21, 1911 | 61 | June 18, 1912 | June, 9 st. 10 lb.<br>July, 9 st. 8 lb. | Not improved. |
| 12 | Feb. 24, 1908 | 51 | June 29, 1912 | July, 6 st. 12 lb. | Diarrhoea and haematoporphorinuria; severe eczema over trunk and limbs; recovery. |

to, could not stand or walk, and lacked all facial responsiveness. During one night she developed oedema of the tongue from some unknown cause, and was then given the extract on June 23rd. The oedema passed off in two days, and she began to take food voluntarily. She has gradually got stronger, is rational, can get up, walk about, and attend to herself.

The other cases are of long-standing duration, and show various degrees of mental dissolution. Some still show evidences of chronic excitement with tendency to violence, others restlessness and resistiveness, 4 out of the 12 cannot be said to have improved. Of these one shows considerable congenital mental defect, another suffers from chronic phthisis.

Another has outbursts of homicidal violence, and the fourth has been in an asylum for about thirty years.

The others have unquestionably undergone decided improvement. They are all cases which formerly required a sedative in some form, but they are now rarely unmanageable and sleep well at night. The general nutrition has shown the most marked change. In one case emaciation was advanced and the patient in a state of mindlessness. In February last she weighed 7 st.; she now weighs 9 st., and there is a concomitant improvement in the mental state.

Five others suffered from skin rashes of various kinds and recurrent boils, which resisted other forms of treatment, but which have now cleared up.

Although there is not an invariable increase in weight, there is certainly an appearance of improved nutrition always present.

### B. *Delusional Insanity.*

Eight cases suffering from this form of mental illness have been under treatment. Of these, two show no appreciable improvement—one shows distressing delusions of organic sensibility, the other is a recent admission in whom hallucinations are pronounced.

No. 1 has improved in the sense that she does not now affect statuesque attitudes, refuse her food, and fail to attend to herself because of her being dominated by "voices." The hallucinations are still present, but she has lately given less attention to them, takes food, and sleeps well; and although she registers a loss in weight, she appears in a state of improved nutrition.

Nos. 5 and 7 are cases showing strong tendencies to violence, marked delusions of identity and of grandeur, who were liable to outbursts of treacherous or open violence and whom it was necessary to control by sedatives. Lately the symptoms have entirely altered; they are now willing helpers, rarely show excitement, and do not tend to violence. The delusional state is much fainter. An interesting point to be noted is that in the beginning of this month the extract was not given to No. 5 for three days. There was an immediate recurrence of the former symptoms of abusiveness and threatening, but these have again disappeared.

*Delusional Insanity.*

| No. | Admitted. | Age | Date of Treatment. | Weight. | Result. |
|---|---|---|---|---|---|
| 1 | Jan. 12, 1912 | 43 | April 25, 1912 | April 25, 7 st. 17 lb.<br>May, 6 st. 12 lb.<br>July, 6 st. 0 lb. | Losing weight, but now taking food well voluntarily; mental state much improved. |
| 2 | Aug. 2, 1910 | 37 | May 6, 1912 | May 6, 9 st. 6 lb.<br>May 25, 9 st. 0 lb. | Delusions affecting organic sensibility; not improved. |
| 3 | May 25, 1912 | 36 | June 1st, 1912 | June, 8 st. 0 lb.<br>July, 7 st. 10 lb. | Not improved. |
| 4 | July 8, 1910 | 46 | April 12, 1912 | April 11, 9 st. 3 lb.<br>July 17, 7 st. 13 lb. | Mental state greatly improved, but patient shows loss of weight; food well taken and nutrition appears good. |
| 5 | Oct. 18, 1908 | 49 | July 14, 1912 | April, 10 st. 7 lb.<br>July 17, 10 st. 7 lb. | Mental state shows signs of early improvement. |
| 6 | July 3, 1907 | 50 | May 30, 1912 | May, 8 st. 0 lb.<br>July, 7 st. 6 lb. | Mental state improved; is in good health, but has lost slightly in weight. |
| 7 | Dec. 6, 1910 | 38 | June 7, 1912 | June, 7 st. 4½ lb.<br>July, 7 st. 9½ lb. | Greatly improved, both mentally and physically. |
| 8 | July 3, 1907 | 49 | June 5, 1912 | June 30, 7 st. 13 lb.<br>July, 8 st. 0 lb. | Mental state improved; physical health stationary. |

### C. *Manic-Depressive Insanity.*

Only 5 cases have been under treatment, and on the whole there has not been any marked reaction. One who is extremely hysterical and liable to recurrences of almost major hysteria improved very much to begin with, but this has not been maintained. In No. 2 there was not the uncontrollable excitement present on former occasions, nor the impulsiveness to violence. Usually at such times she has had to be nasally fed, but on this occasion she has taken food voluntarily. No. 4 showed considerable mental and physical improvement during the early part of the year, but she is again passing through a period of excitement. Her general health, however, this time continues

*Manic-Depressive Insantity.*

| No. | Admitted. | Age | Date of Treatment. | Weight. | Result. |
|---|---|---|---|---|---|
| 1 | Mar. 6, 1912 | 48 | Jan. 4, 1912 | Jan., 6 st. 8 lb.<br>May, 6 st. 3 lb.<br>July, 6 st. 10 lb. | Not improved; patient is extremely hysterical and liable to episodes; improved for a time, but has relapsed; is in good health. |
| 2 | July 13, 1907 | 53 | — | July, 6 st. 8 lb. | Excitement less intense and prolonged when under treatment. |
| 3 | Aug. 16, 1911 | 40 | May 25, 1912 | May, 8 st. 0 lb.<br>July, 7 st. 12 lb. | Not improved. |
| 4 | Jan. 14, 1911 | 47 | Jan. 22, 1912 | Jan., 7 st. 3 lb.<br>May, 8 st. 1 lb.<br>July, 7 st. 13 lb. | Not improved; patient greatly improved in general nutrition at the commencement, but mental symptoms have recurred. |
| 5 | Aug. 12, 1907 | 50 | Feb. 5, 1912 | Feb., 7 st. 6 lb.<br>May, 8 st. 0½ lb.<br>July, 8 st. 6½ lb. | During the last attack the patient did not reach such a degree of mental degradation as on former occasions. |

*Epileptic Insanity.*

| No. | Admitted. | Age | Date of Treatment. | Weight. | Result. |
|---|---|---|---|---|---|
| 1 | July 12, 1907 | 42 | — | Feb. 14, 9 st. 2 lb.<br>May 25, 9 st. 0 lb.<br>July 17, 9 st. 0 lb. | Improved. |
| 2 | July 12, 1907 | 40 | Jan. 30, 1912 | Feb. 14, 7 st. 9 lb.<br>May 25, 8 st. 0 lb.<br>July 17, 7 st. 9 lb. | Improved. |
| 3 | Aug. 15, 1911 | 40 | Mar. 23, 1912 | Feb. 14, 7 st. 6 lb.<br>May 25, 7 st. 7 lb.<br>July 17, 7 st. 12 lb. | Not improved. |
| 4 | Nov. 29, 1911 | 37 | Mar. 20, 1912 | Feb. 14, 9 st. 11 lb.<br>May 25, 10 st. 0 lb.<br>July 17, 9 st. 4 lb. | Not improved. |
| 5 | Sept. 5, 1911 | 31 | Feb. 1, 1912 | Feb. 14, 7 st. 8 lb.<br>May 25, 8 st. 4 lb.<br>July 17, 8 st. 12 lb. | Not improved. |
| 6 | July 23, 1909 | 32 | Feb. 29, 1912 | Feb. 14, 6 st. 6 lb.<br>May 25, 6 st. 4 lb.<br>July 17, 6 st. 6 lb. | Improved. |
| 7 | Dec. 18, 1908 | 52 | Feb. 14, 1912 | Feb. 14, 7 st. 9 lb.<br>May 25, 7 st. 10 lb.<br>July 17, 8 st. 0 lb. | Improved. |
| 8 | Nov. 15, 1911 | 21 | Apr. 25, 1912 | Feb. 14, 6 st. 5 lb.<br>May 25, 6 st. 5 lb.<br>July 17, 6 st. 3 lb. | Not improved. |
| 9 | Feb. 22, 1912 | 44 | Mar. 7, 1912 | Feb. 14, 6 st. 11 lb.<br>May 25, 7 st. 1 lb.<br>July 17, 7 st. 2 lb. | No change. |
| 10 | April 17, 1908 | 27 | Mar. 11, 1912 | Feb 14, 8 st. 4 lb.<br>May 25, 7 st. 10 lb.<br>July 17, 7 st. 13 lb. | Not improved. |
| 11 | Jan. 20, 1908 | 29 | Jan. 25, 1912 | Feb. 14, 8 st. 11 lb.<br>July 17, 9 st. 2 lb. | Improved. |
| 12 | Nov. 17, 1908 | 22 | Jan. 22, 1912 | Feb. 14, 5 st. 13 lb.<br>July 17, 5 st. 5 lb. | Improved considerably under fetal brain extract; ordinary extract no effect; both are imbeciles; No. 13 is phthisical. |
| 13 | Dec. 28, 1910 | 11 | Jan. 4, 1912 | Feb. 14, 4 st. 0 lb.<br>July 17, 2 st. 13½ lb. | |

good. In the case of No. 5 recurrence of the present period of excitement has not been attended by the utterly depraved behaviour that has been present on former occasions. The patient also improves in health.

### D. *Epileptic Insanity.*

The idea of giving the extract arose in an attempt to find some agent for controlling the severity of the fits; as far as I know every form of treatment has been tried with the exception of fetal brain.

An extract of this was prepared and given to two cases of imbecility who suffered from fits of the utmost severity. During the month I was able to give it, the number per week was reduced from twenty to five in the one case; and in the other the severity was so altered that the fits became of the nature of *petit mal*.

Later the ordinary extract was substituted. In no case has the number or severity of the fits been reduced; but in the inter-fit period there is a very noticeable modification of the mental state. The patients are easier to manage, less given to grumbling and discontent, and outbursts of violence are rare and of shorter duration.

### E. *Confusional Insanity.*

With regard to the insanities of recent origin probably the most striking results are obtained in this form of mental illness. There can be no question of the almost immediate modification of the mental and physical states. The improvement of food appetite, the onset of sleep, the rapid disappearance of the secondary signs of autointoxication, such as furred tongue, sordes of teeth and lips, herpes, and the exhausted expression peculiar to such patients, are most noticeable. Coincident with the disappearance of these the mental state becomes calm, the hallucinations wane, restlessness, confusion, and noisiness are allayed and disappear, and the patient enters into a state of convalescence within thirty-six hours. Case 1 was a typical case of acute delirious mania—restless, mindless, noisy, refusing food and vomiting everything given, herpes, sordes, and constipation. She was given the extract five days after admission. Next day the vomiting stopped, she slept, became less agitated, and took food. Convalescence is progressive.

Cases 3 and 5 showed similar states of delirious excitement, which in both cases commenced to clear up immediately after taking the extract. In the case of No. 5 the improvement has been so pronounced that her friends insist on having her at home. In No. 3 the extract was stopped on July 7th, but the patient in a day or two commenced to experience a feeling of ill being and emotionalism, which were the initial symptoms of her illness prior to admission. With the recommencement of the extract the symptoms have practically disappeared.

No. 4. Chorea, intense hallucinations of hearing urging her to an act. The patient made two determined efforts to reach her children, whom she thought were outside, by pushing her head through a pane of glass. On both occasions she cut herself severely. Sedatives only induced transient quietude; they were stopped altogether. The extract was substituted, and attended with improvement within the usual time. There has been no recurrence; the patient is now in an advanced state of convalescence, and will very likely be discharged in the near future. The chorea has disappeared.

Case 2 showed a marked degree of malnutrition on admission, and suffered from septic skin rashes. She now takes food voluntarily, and the skin is now quite healthy. She is almost deaf, and the basis of her illness is probably delusional insanity.

No. 6, a case of long-standing excitement, passed into a state of extreme physical prostration, attended with emaciation; temperature, 101°. A comatose state supervened, with muttering delirium and subsultus. A day or two after the extract was given improvement set in, the delirium passed off, and the patient took food herself. She collapsed somewhat suddenly on July 6th, and at the *post-mortem* examination death was found to be due to haemorrhagic pancreatitis.

*Amentia (Confusional Insanity).*

| No. | Admitted. | Age | Date of Treatment. | Weight. | Result. |
|---|---|---|---|---|---|
| 1 | July 5, 1912 | 37 | July 11, 1912 | July, 6 st. 5 lb. | Great improvement in nutrition and in mental state. |
| 2 | Dec. 2, 1911 | 47 | April 16, 1912 | April, 5 st. 4 lb.<br>May, 6 st. 10 lb.<br>July, 6 st. 3 lb. | Nutrition greatly improved; mental symptoms less acute; patient partially deaf. |
| 3 | April 1, 1912 | 44 | April 23, 1912 | April, 7 st. 4 lb.<br>May, 8 st. 5 lb.<br>July, 8 st. 0 lb. | General health greatly improved; mentally, convalescence advanced. |
| 4 | Jan. 13, 1912 | 48 | April 8, 1912 | April, 7 st. 10½ lb.<br>May, 8 st. 1 lb.<br>July, 8 st. 3 lb. | Health much improved; chorea disappeared; convalescence advanced. |
| 5 | May 31, 1912 | 45 | June 1, 1912 | June 14, 8 st. 0 lb.<br>July 17, 10 st. 13 lb. | Great improvement in general health: patient to be discharged. |
| 6 | Sept. 5, 1911 | 33 | May 14, 1912 | April, 9 st. 0 lb. | Patient, from being in a state of complete prostration and emaciation, rallied and gained in weight; ultimately died of haemorrhagic pancreatitis. |

### F. *Dementia Praecox.*

Fourteen cases have been under treatment, and the rule has been that cases of any degree of recency have improved; 8 cases have definitely reacted; and of the remaining 6, 2 are of long standing. Of those that have improved, 3 are in an advanced state of convalescence and 2 have passed from a state of emaciation to one of good health. Unfortunately, the mental symptoms in these two have not altered in the same ratio, but they are manageable without the aid of other treatment. In addition to improved appetites for food and sleep and general health, there is a definite reduction in the degree of katatonia and negativism.

*Dementia Praecox.*

| No. | Admitted. | Age | Date of Treatment. | Weight. | Result. |
|---|---|---|---|---|---|
| 1 | Sept. 5, 1907 | 27 | June 26, 1912 | June, 7 st. 8 lb.<br>July, 6 st. 9½ lb. | (Old standing.) Not improved. |
| 2 | Jan. 28, 1909 | 25 | June 5, 1912 | June, 7 st. 4½ lb.<br>July, 6 st. 12½ lb. | Not improved. |
| 3 | Sept. 17, 1910 | 37 | Mar. 21, 1912 | May, 7 st. 8 lb.<br>July, 8 st. 11½ lb. | From October to May patient physically prostrate and mentally mindless; improved, but has relapsed. |
| 4 | April 26, 1911 | 22 | June 21, 1912 | June, 10 st. 0 lb.<br>July, 10 st. 6 lb. | Much improved. |
| 5 | June 16, 1910 | 36 | Mar. 19, 1912 | Mar., 7 st. 5 lb.<br>May, 7 st. 12½ lb.<br>July, 8 st. 6 lb. | Greatly improved physically and mentally. |
| 6 | July 27, 1911 | 30 | — | Jan., 5 st. 12 lb.<br>May, 7 st. 3 lb. | Greatly improved physically; mental convalescence advanced |
| 7 | Oct. 19, 1911 | 22 | Feb. 9, 1912 | Feb., 6 st. 10 lb.<br>May, 8 st. 0 lb. | Greatly improved physically; mental convalescence advanced. |
| 8 | Mar. 19, 1912 | 20 | April 2, 1912 | April, 6 st. 7 lb.<br>May, 7 st. 2 lb.<br>July, 7 st. 0 lb. | Improved mentally and physically. |
| 9 | July 19, 1911 | 27 | July 2, 1912 | July 2, 7 st. 6 lb.<br>July 17, 7 st. 12 lb. | Much improved mentally; is gaining weight. |
| 10 | Sept. 10, 1911 | 30 | June 10, 1912 | June, 8 st. 4 lb.<br>July, 8 st. 6 lb. | Not improved. |
| 11 | April 30, 1912 | 28 | May 16, 1912 | May, 8 st. 0 lb.<br>July, 8 st. 2 lb. | Not improved. |
| 12 | June 30, 1912 | 22 | July 4, 1912 | July 4, 8 st. 10 lb.<br>July 17, 8 st. 9 lb. | Is showing signs of early convalescence. |
| 13 | July 6, 1910 | 32 | June 28, 1912 | June, 8 st. 0 lb.<br>July, 8 st. 0 lb. | Not improved. |
| 14 | May 22, 1912 | 19 | May 24, 1912 | Not taken | Not improved. |

### G. *Melancholia.*

Patients suffering from melancholia in one or other of its forms also show decided improvement. With two exceptions, the 9 cases treated have gained in weight; one

*Melancholia.*

| No. | Admitted. | Age | Date of Treatment. | Weight. | Result. |
|---|---|---|---|---|---|
| 1 | Apr. 8, 1911 | 54 | Mar. 15, 1912 | Mar., 9 st. 0 lb.<br>May, 9 st. 6 lb.<br>July, 8 st. 4 lb. | Greatly improved mentally; during this recurrence (recurrent melancholia) the patient has not been suicidal. Has always been so before. |
| 2 | Oct. 11, 1909 | 39 | Mar. 24, 1912 | Mar., 7 st. 3 lb.<br>May, 7 st. 2 lb.<br>July, 7 st. 4 lb. | Chronic melancholia: patient has improved mentally. |
| 3 | Sept. 8, 1911 | 47 | June 9, 1912 | June, 8 st. 0 lb.<br>July, 9 st. 2 lb. | Patient shows a great improvement both mentally and physically. |
| 4 | Dec. 24, 1911 | 39 | April 2, 1912 | May, 7 st. 10 lb.<br>July, 7 st. 13½ lb. | Much improved mentally and physically. |
| 5 | Nov. 13, 1911 | 51 | May 14, 1912 | May, 5 st. 0 lb.<br>July, 5 st. 5 lb. | Improved mentally; attack of diarrhoea May 29th–June 6th; recovery; patient emaciated. |
| 6 | June 25, 1911 | 51 | Feb. 8, 1912 | Mar., 10 st. 8 lb.<br>May, 10 st. 7 lb.<br>July, 10 st. 10 lb. | Greatly improved mentally. |
| 7 | Mar. 2, 1912 | 38 | June 6, 1912 | June, 8 st. 1 lb.<br>July, 8 st. 9 lb. | Greatly improved mentally. |
| 8 | Mar. 20, 1912 | 55 | May 22, 1912 | May, 6 st. 10½ lb.<br>July, 7 st. 13 lb. | Mentally and physically improved. |
| 9 | July 5, 1911 | 62 | April 18, 1912 | Apr., 9 st. 5 lb.<br>July, 9 st. 3½ lb. | Mentally improved. |

has lost 1½ lb. since April; the other, a recurrent case, has lost 1 st. 2 lb. since May, but on former recurrences the patient has invariably been actively suicidal; on the present occasion she has never reached the depths of mental distress, and has always denied inclination to suicide. She is now showing distinct signs of improvement.

Cases 3 and 6, who formerly spent their day weeping bitterly and complaining that all their food went into their lungs and choked them, now employ themselves usefully and are progressively improving.

Case 4 showed unsurpassed distress both day and night at the idea of her being condemned and in the power of Satan, whose medium for evil she was. It would be difficult to find a case in whom the agony, hopelessness, and despair were more marked than in this patient. Prior to admission she made a desperate attempt to end her life by exposure and sheer starvation. No improvement was recorded four months after admission; she was then given the extract during the height of a paroxysm of acute distress at Easter. Since then the whole complexion of the case has altered; she now occupies herself usefully and takes an interest in others, she has slept well without the aid of any sedative, and morbid brooding and concern for her spiritual welfare are reduced to practically nothing.

At present I am not prepared to give any particulars as to other effects which this preparation has on the processes of digestion and the blood, or to offer any but the merest suggestion as to its action. That it has a powerful influence in various diseased mental states there is little room for doubt. If it can be shown that the various constituents of brain tissue are altered in various diseases, then the supplying of these in an easily assimilable form may induce the re-establishment of healthy working and so lead to a disappearance of the mental symptoms.

## THE RESULTS OF THE WASSERMANN REACTION IN 150 CASES OF MENTAL DISEASE.

By DAVID NABARRO, M.D., M.R.C.P.Lond.,

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SINCE 1906, when Wassermann and Plaut first demonstrated the relation between syphilis and general paralysis by obtaining a series of positive Wassermann reactions with the cerebro-spinal fluid of general paralytics, a considerable number of similar investigations with the serum and cerebro-spinal fluid of patients has been carried out both in this country and abroad. In the main the results of these later investigations agree with those of Wassermann and Plaut, but one fact is still unaccounted for—namely, that the percentage of positive results with cerebro-spinal fluid ranges from 100, which was obtained by Morgenroth and Stertz, to 41.5 obtained by Schölberg and Goodall. In the case of the serum, too, of general paralytics, similar, though less extensive, variations are recorded. Boas and Plaut obtained 100 per cent. of positive results with the serums of 139 and 147 cases respectively; whereas Schölberg and Goodall obtained only 75.5 per cent., and Marie, Levaditi, and Yamanouchi only 59 per cent. of positive results with general paralytic serums.

In endeavouring to find an explanation of these discordant results, it occurred to Dr. Shaw Bolton and myself that it might be advisable to examine a long series of cases and to separate them into groups which are clinically different, such as acute, subacute, and chronic; also to consider the male and female cases separately; likewise the juvenile, adult, and senile forms of the disease; and, lastly, to examine microscopically the brains of as many of the cases as possible with a view to ascertaining whether or no there be any correlation between a positive Wassermann reaction and the microscopic changes found *post mortem*. This somewhat ambitious programme has not yet been carried out in its entirety, as many of the patients are still alive, but we hope to be able to write a complete account of these investigations at some future date.

### *Technique.*

The technique employed was practically the original Wassermann method, which was demonstrated to me by Dr. H. R. Dean, of the Lister Institute, to whom I would here express my indebtedness. The only departure from the original method was in the antigen extract which I employed. During the eighteen months that I was carrying out the investigations I had to use several extracts, and these were made in different ways. In a few of my earlier experiments an alcoholic extract of fetal syphilitic liver or of guinea-pig's heart was used. For a considerable number of experiments I used an acetone-alcohol extract of syphilitic liver prepared by the plaster-of-Paris method described by Dr. Candler in his paper in the *Lancet* of November 11th, 1911. I am indebted to Dr. Mott for a supply of this extract. Latterly I have used an extract similarly prepared, but from the liver of a case of juvenile general paralysis, and have found this extract work well for several months. In many experiments these extracts were controlled against one another, and also against an alcoholic extract of normal human heart. Before doing the actual experiment the haemolytic serum was invariably titrated in falling doses with guinea-pig's complement (0.05 c.cm.), and three times the minimal lytic dose was used for the test. All the necessary controls were put up, and the tubes were finally incubated for two hours at 37° C., and read the next morning after standing in the ice-chest overnight. In recording my results I use the numbers 1 to 7 to indicate the amount of haemolysis that has occurred. Thus, 1 indicates complete inhibition or a "strongly positive" reaction; 2 and 3 very slight and slight haemolysis respectively or a "positive" reaction; 4 indicates a considerable degree of haemolysis or a "partial" reaction; 5 means a very considerable degree of haemolysis or a "slight" reaction; 6 is given to a tube in which haemolysis is almost complete, and would only be taken as evidence of a "very slight" reaction in the case of a serum or fluid which has reacted positively on a previous occasion; 7 means complete haemolysis and a negative reaction.

### *Classification of the 150 Cases Tested.*

In an investigation of this kind one of the greatest difficulties in tabulating the results is the correct diagnosis of the cases. If, for example, one only examined the blood or cerebro-spinal fluid of cases which were *obviously* general paralysis, one would get a higher percentage of positive Wassermann reactions than if one examined a consecutive series of general paralytics—those which were well-marked cases as well as the less obvious. Then, again, in a doubtful case of general paralysis, the diagnosis might be made to depend upon the result of the Wasser-

mann reaction, and if this were negative the case might be classed with the non-general paralytics. Obviously such a procedure would raise the percentage of positive results in general paralysis, and this may account for some of the very high percentages obtained by previous investigators.

In the present series of cases the diagnosis has invariably been made by an expert alienist—Dr. J. Shaw Bolton, the Medical Director of the Wakefield Asylum—independently of the Wassermann reaction, and in this way all bias has been, so far as possible, eliminated.

The 150 cases included in this series may be grouped as follows:

Group I, 30 cases, not general paralysis. The diagnoses were: Premature dementia, high-grade aments, hypochondriasis with mild dementia, imbecility with or without epilepsy, moral insanity, melancholia with confusion, acute and chronic mania, tuberculous meningitis, temporary psychosis, epilepsy following injury and alcohol, progressive senile dementia, dementia with coarse brain lesion, alcoholic dementia, and Broca's aphasia in ordinary dementia. Twenty-four were males and six females. The Wassermann reaction was negative in both the blood and cerebro-spinal fluid of all these cases.

Group II includes 6 cases of known syphilitics, all males, and without any symptoms of general paralysis. The blood was positive in 4 and negative in 2; the cerebro-spinal fluid negative in 5 and slightly positive in 1. On a subsequent occasion it was negative in this case too.

Group III includes 16 cases of doubtful general paralysis—11 males and 5 females. The reaction was negative in both blood and fluid in all these cases.

Group IV includes 3 cases of aberrant general paralysis, 2 males and 1 female. In 1 male the blood and fluid were both negative; in the other the blood was negative and the fluid positive; and in the female the blood was positive and fluid negative.

Group V includes 94 cases of general paralysis, or of dementia paralytica—70 males and 24 females. The results of the Wassermann reaction in these cases will be considered in detail a little later on.

Finally, there was one anomalous case of a woman whose blood and fluid both gave a strongly positive reaction, and who nevertheless shows no signs of general paralysis. Dr. Bolton has diagnosed her as a case of progressive presenile dementia.

In nearly every case the blood and cerebro-spinal fluid were drawn simultaneously, and in a large number of instances two or three different amounts of serum and cerebro-spinal fluid were used for the test. The serum was always inactivated at about 56° C., and 0.1 c.cm., 0.2 c.cm., and sometimes also 0.05 c.cm. was used. The cerebro-spinal fluid was not centrifuged unless there was any blood present in it; 0.25 c.cm., 0.5 c.cm., and latterly also 0.8 c.cm. of the fluid was used for the test.

*Results of the Wassermann Test in 94 Cases of General Paralysis and Dementia Paralytica.*

These 94 cases of general paralysis and dementia paralytica may be subdivided into four groups: (*a*) Those in which the blood and cerebro-spinal fluid both gave a negative Wassermann reaction—these were 22 in number, or 23.4 per cent.; (*b*) those in which the blood was negative and the fluid positive—9 in number, or 9.6 per cent.; (*c*) 7 in which the blood was positive and the fluid negative =7.4 per cent.; and (*d*) those in which the blood and fluid were both positive—56 in number, or 60 per cent.

These results may also be classified according as the serum or the fluid was positive or negative. In our series of 94 cases the serum was positive in 63, or 67 per cent., and negative in 31, or 33 per cent. The cerebro-spinal fluid was positive in 65—that is, 70 per cent.—and negative in 29—that is, 30 per cent. It will be remembered that Plaut, Marinesco, and others found the serum more often positive than the cerebro-spinal fluid; while, on the other hand, Marie, Levaditi and Yamanouchi, Raviart, and others have found the reaction more constant in the cerebro-spinal fluid than in the blood. My own observations seem to point to the conclusion that the reaction is slightly more constant in the fluid than in the serum, and, further, I very frequently observed that, when the blood and fluid were both positive, the reaction was stronger with the cerebro-spinal fluid than with the serum.

These results may be looked at from yet another point of view, according as the reaction was negative in *both* blood and fluid or positive in one or other or both of these fluids. As already mentioned, the blood and fluid were negative in 23.4 per cent. of the cases, so that in the remaining 76.6 per cent. the Wassermann reaction was positive in either blood or cerebro-spinal fluid or both.

I am sorry to have to weary you with another set of statistics, especially as my series is rather a small one to subdivide into male and female cases; but as this has not been done hitherto, so far as I am aware, and as the numbers obtained in this way are rather interesting and suggestive, I shall venture to give them to you.

As previously stated, my 94 cases included 70 males and 24 females. Of the 22 whose blood and fluid were both negative, 14 were males—that is, 20 per cent., or exactly one-fifth of all the males examined; whereas 8 were females, or exactly one-third of all the females examined. In other words, a female general paralytic is more likely to give a negative Wassermann reaction in the blood and cerebro-spinal fluid than is a male general paralytic. This result may be correlated with the clinical observation that cases of general paralysis are usually of a more insidious and chronic type in women than in men.

Of the 72 cases whose blood or fluid or both gave a positive reaction, 56 were males, or exactly four-fifths of the total males examined; and 16 were females, two-thirds of all the female general paralytics examined. When, however, we come to inquire into the percentages of males and females whose blood or fluid was negative or positive, we find that 33 per cent. of both males and females gave a negative blood reaction and 67 per cent. a positive reaction. With the cerebro-spinal fluid the numbers are rather different; only 28.6 per cent. of the males gave a negative reaction with the fluid and 71.4 a positive reaction, whereas 37.5 per cent. of the women gave a negative and 62.5 per cent. a positive reaction with the fluid. This seems to show that the blood of a female general paralytic may give a positive Wassermann reaction as frequently as that of a male, but that the cerebro-spinal fluid does so considerably less often.

I may mention that when a patient gave a negative result the observation was generally repeated two or three months later, and in some cases it was repeated twice. Many patients who gave a positive reaction were also re-examined, with the result that the reaction was often found to vary in intensity; but the details of these observations have not yet been worked out, and will be given in our fuller paper upon the subject. Lastly, I should like to make a few remarks upon the solutions of blood and cerebro-spinal fluid used. In a considerable number of cases a 1 in 10, 1 in 5, and 1 in 2½ dilution of serum was used for the test—that is to say, 0.05 c.cm., 0.1 c.cm., and 0.2 c.cm. of the neat serum. In one quarter of the number of cases the reaction was negative with 1 in 10 and positive with the other dilutions; and in nearly one-half the cases the reaction was less marked with 1 in 10 than with the 1 in 5 and 1 in 2½ dilutions. In 54 experiments in which the 1 in 5 and 1 in 2½ dilutions were compared, the reactions were of equal intensity in 29, rather more than one-half. In 22 the reaction with 1 in 5 dilution was less marked than with 1 in 2½, but in very few instances was the difference more than one degree on my scale—1 to 7, mentioned previously. In 3 cases the reaction was rather more marked with the 1 in 5 dilution than with the 1 in 2½. From these observations I would draw the conclusion that one cannot rely upon the results if only 0.05 c.cm. of serum is used, and that 0.1 c.cm. should always be used for the test. If enough serum is available 0.2 c.cm. can also be used, but this is not absolutely necessary. In my earlier experiments I used only 0.2 c.cm. of cerebro-spinal fluid for the test, but afterwards I used 0.5 c.cm.. and later still 0.8 c.cm. in addition to the other two. Out of 44 cases in which all three strengths of fluid were used 24 gave a positive reaction of the same intensity with 0.2 c.cm., 0.5 c.cm., and 0.8 c.cm. Of the other 20, 5 gave a negative reaction with 0.2 c.cm. and a positive with 0.5 c.cm. or 0.8 c.cm. and the remaining 15 gave a less marked reaction with 0.2 c.cm. than with 0.5 c.cm. and 0.8 c.cm. Twice the reaction was negative with 0.5 c.cm. and good or partial with 0.8 c.cm., and once it was very slight with 0.5 c.cm. and positive with 0.8 c.cm. It follows, therefore, that at least 0.5 c.cm. of cerebro-spinal fluid

must be used when tested for the Wassermann reaction, and, when practicable, 0.8 c.cm. should also be used.

*Conclusions.*

The following conclusions may be drawn from these observations:

1. That in a considerable number of cases of general paralysis the blood and cerebro-spinal fluid may give a negative Wassermann reaction, even on repeated examinations. I am therefore unable to agree with McIntosh and Fildes, who state in their monograph on syphilis that "a negative reaction in serum in a suspected case of general paralysis will render this diagnosis improbable"; and again, that "a negative reaction in the cerebro-spinal fluid of a general paralytic is unusual."

2. That a negative Wassermann reaction is more likely to be obtained in the case of a female general paralytic than of a male.

3. That the blood is negative rather more often than the cerebro-spinal fluid in the case of male patients, but the reverse obtains in the case of female patients.

4. That at least 0.1 c.cm. of serum should be used for the test, and, where practicable, 0.2 c.cm. should also be used, but is not absolutely essential.

And lastly, that at least 0.5 c.cm. of cerebro-spinal fluid must be used, and, if possible, also 0.8 c.cm., otherwise a small percentage (about 4 or 5) of positive results may be missed.

## DISCUSSION.

Dr. MCKENZIE (Glasgow) said that Gilmour had found that 0.05 to 0.1 c.cm. represented the optimum amount of blood serum necessary to give a positive Wassermann reaction. The cerebro-spinal fluid was different, and at least 0.5 c.cm. should be used in each case. More delicate results were obtained by titrating the complement and measuring the amount of complement deviated by the mixture of fluid and extract. They had obtained a positive blood and cerebro-spinal fluid result with 100 per cent. of 50 cases diagnosed independently.

## OBSERVATIONS ON THE NATURE OF DEMENTIA PRAECOX.

By IVY MCKENZIE, M.B., and R. M. MARSHALL, M.D.

THERE is probably no department of clinical psychiatry to which recent research in pathology has afforded less assistance than that which concerns those cases which belong to the group designated by Kraepelin as "dementia praecox." About three years ago we began a series of investigations, which included the examination of the blood, cerebro-spinal fluid, and urine of patients which we regarded as belonging to this class. The presence of the cobra venom reaction (Much's reaction), the leucocytic state of the blood, and the relative increase or diminution of certain urinary constituents failed completely to provide us with data which could be relied on, either to distinguish these cases from other cases of insanity or the different varieties of "dementia praecox" from one another. Ross, for example, who did the cobra venom reactions for us, found that while that reaction was positive in some cases, it was also present in other cases of insanity, and could be obtained with blood serum from sources where there was no suspicion of nervous disease. Morton examined for us the cerebro-spinal fluid from a large series of cases, but only in two cases was any abnormality detected, and this abnormality did not serve to distinguish those cases from others in which an acute pathological process in the cerebro-spinal system was known to be present. These two cases are of some interest, however, and will be referred to later.

The unsatisfactory results of these observations suggested the advisability of prosecuting another line of research, and it occurred to us that some light might be thrown on the nature of the condition by a systematic examination of the progress of the disease in a selected number of cases in which the mental symptoms and somatic disturbances were pronounced and capable of analysis from the earliest stages. The commonly accepted descriptions and interpretations of the symptoms of the disease are based for the most part on psychological phenomena. Its origin and course has, as a rule, been traced in the anomalies of ideation and conduct which present the most outstanding features of the trouble, and, in the opinion of some observers, these anomalies themselves, in addition to being symptomatic, possess a causal relationship to the onset and progress of the disease. It is not our purpose on the present occasion to examine this method of interpretation. We recognize that an insane idea or an hallucination, *once it has arisen*, may exercise a determining influence on the mental state and conduct of the patient; and it is an important subject for psychological analysis to discover in a given case, if possible, what may be the original perversion, and to distinguish that from the secondary manifestations of disease which it carries in its train. Our object is rather to inquire what evidence there is for the supposition that dementia praecox is an organic brain disease in the sense in which that term is applied to general paralysis, cerebral endarteritis, or cerebral sclerosis.

It is a well-recognized fact that in any pathological entity which may be termed a "disease" the intensity and extent of the destruction or degeneration varies from case to case. This variation depends upon the amount of the noxious substance acting on the tissues and the duration of its presence; a contributing factor to the result is also the special liability of the affected tissue to succumb to the influence of the process. It was in recognition of these facts that we made a selection of certain cases which we regarded as exhibiting the more pronounced features of the disease. In the case of an epidemic of enteric fever or scarlet fever the nature of the disease in some cases can only be recognized because of the prevalence of the infection. It is therefore quite obvious that there is every likelihood that dementia praecox may appear in forms in which it cannot be recognized as such; and there may be cases whose identity is beyond question, but which nevertheless do not present those characteristics which would enable the observer to throw any new light on the nature of the process.

*Sudden Onset of Acute Symptoms.*

As we have already suggested, considerable emphasis has been laid on the fact that in many instances a careful scrutiny of the "previous history" of the case reveals certain traces of unusual disposition or conduct. This is interpreted as indicating the commencement of an abnormal psychological process which culminates in the full-blown illness. Be that as it may, the fact remains that in many cases the acute process which determines the dementia and characteristic features of the clinical entity is sudden in its onset, runs a definite course, and terminates in a state where there is obliteration or dulling of certain mental qualities. In the series of cases which we selected for particular observation the dementia which followed the acute process did not progress indefinitely. That is to say, the process would appear to have ceased so far as the brain degeneration was concerned, and the clinical complex was composed of those phenomena which manifested the readaptation of the nervous system in its damaged state to the environment. The period during which the acute process lasted varied from three months to nine months or a year. It was characterized, apart from the mental condition, by somatic disturbances of a very pronounced character. These varied in intensity in different cases. As a rule, they showed themselves in the form of: (1) Rise in temperature, which might be of a recurrent character at intervals of days, or might be more or less constant for weeks. (2) An increase of the leucocytes in the blood stream varying from 12,000 to 20,000 per c.mm. (3) Intestinal disturbances in the form of diarrhoea with foul-smelling stools and meteorism. (4) Affections of the joints, with transient contractures. These joint affections sometimes resemble those met with in septic processes and in scarlet fever. (5) Marked salivation was a feature of the acute stage in some cases. (6) A general rigidity of the muscles (katatonia). (7) The cerebro-spinal fluid in 2 cases showed the presence of a considerable amount of albumen, globulin and albumose, in addition to a large number of mononuclear leucocytes. (8) In some cases the most acute phase of the disease was marked by the presence of what might be termed a "typhoid state."

It may be objected that these are not typical cases of dementia praecox, that they belong rather to the type of

case which is regarded as "toxic." But it is on the decision of this point that the elucidation of the nature of the disease depends. Such cases may not be the most common, because as a rule the disease manifests itself in a less acute form. The following cases, however, suggest that such symptoms are characteristic for the disease in its more general manifestations.

CASE I.

M. M., female, 40 years, suffered from dullness and depression for some months. She became acutely ill with fever, diarrhoea, meteorism, salivation, and rigidity of the muscles. The cerebro-spinal fluid was increased in amount, contained albumen globulin, albumose, and a large number of mononcular leucoytes. There were no tubercle bacilli, and the Wassermann reaction was negative. She died in the acute stage, suffering from an intercurrent bronchopneumonia. During the acute illness she was stuporose. A necropsy was not obtained.

CASE II.

M. H., male, 40 years, had been suffering for six months from depression and disinclination to work. He became acutely ill with fever, diarrhoea, and meteorism; the stools were very foul. He was acutely katatonic. The cerebro-spinal fluid was under high pressure; it contained a considerable amount of albumen, albumose, and globulin, and also a large number of mononuclear leucocytes. There were no tubercle bacilli, and the Wassermann reaction was negative. The acute stage of the illness lasted about four months. He gradually recovered from the somatic disturbances, but emerged from the illness presenting the typical mental state of dementia praecox. The dementia has not increased during the two years subsequent to the attack.

These two cases were under observation at the same period. They were types of an acute toxic illness with obvious cerebral involvement, either primary or secondary. At the time it was impossible to state definitely what the nature of the disease was. The clinical picture suggested typhoid fever, meningitis, or miliary tubercle; the blood, however, was negative on bacteriological examination, and no exciting cause could be detected. One case terminated fatally, probably as a result of the pneumonia; the other case revealed itself as typical of dementia praecox.

The condition of the cerebro-spinal fluid pointed definitely to a pathological process in the cerebro-spinal system. The fluid in the case which recovered was clear six months after the acute process had passed off. There would seem to be little doubt but that in each case the symptoms were due to a lesion of the brain. The lesion must have been limited in extent, for although the dementia is advanced in the case which recovered, there is now no evidence of motor or sensory disturbance of any kind.

We cite these cases in support of our contention that dementia praecox is probably the result of a cerebritis active over a short period, and terminating definitely, leaving a partially destroyed brain, whose incapacity for normal adaptation gives rise to the characteristic mental features of the disease. We have consulted the records of some of the oldest dements under our observation, and have found in some cases that the disease was ushered in by what was termed at the time "acute mania." Twenty, thirty, and in one case fifty, years have elapsed since the onset of the illness, and in the interval it would appear that little or no progress of mental deterioration has occurred. Those who have been in attendance on these cases for fifteen to twenty years testify to the stationary character of the mental state.

It is, of course, a matter of frequent occurrence that those patients in the stationary state suffer from recurrent attacks of excitement and depression. But these intercurrent disturbances are no part of the disease; they are the evidence of disturbance of mental balance in a weakened brain, and when they pass off the mental condition of the patient is found not to have suffered further deterioration as a result. It does, however, sometimes happen that a genuine recurrence of the original trouble takes place, and in such cases the patient emerges from the second attack more deeply demented.

It may reasonably be asked what explanation is offered of those indefinite prodromal symptoms which are not infrequently seen to precede the acute illness. Are these part of the same process, or do they indicate, as some observers suggest, a condition of weak-mindedness or imbecility? Some authorities go so far as to designate all cases of dementia praecox the expression of a congenital mental deficiency. We regard the early mental abnormalities, such as suspicion, fear, want of initiative, lack of control, and sleeplessness, as part and parcel of the disease itself. The acute stage which determines the deeper dementia may be ushered in by a severe mental shock, or any other circumstance which occasions a depression of organic vitality. This interpretation is suggested and supported by the fact that in cerebro-spinal meningitis, for example, the acute symptoms of the disease are not infrequently induced by the incidence of a severe blow on the head of a patient whose previous history shows that he has for some days or weeks been subject to headaches and vomiting indicative of a milder degree of infection. It is, moreover, a well recognized fact that the symptoms of chorea or exophthalmic goitre may be precipitated by a severe "mental trauma." It may be that dementia praecox occurs in some instances in cases otherwise mentally deficient, but no facts have so far been adduced to show any causal relationship between the disease itself and congenital defect.

On the other hand, it is claimed that hereditary predisposition plays an important part in the etiology of the process. This contention is usually put forward without any further inquiry as to its significance. We do not deny the importance of heredity in this context as a biological fact, but that does not involve the admission that the hereditary element constitutes *per se* a pathological abnormality. It is far more likely that the pathological factor is superimposed afresh on an otherwise healthy organism. There is no reason to believe that heredity is a more dominant factor in dementia praecox than in the subjects of a rheumatic diathesis. Every disease which is the manifestation of a constitutional organic reaction involves the presence of a predisposition, otherwise it would not occur. The importance of heredity as a factor in the etiological analysis of dementia praecox can only be of value if it can be shown that cases occur in which there is definitely no hereditary predisposition. Whatever value the elusive generalization of heredity may possess in analysing the factors of social hygiene, and whatever importance it may possess in the advocacy of the programme of eugenic propagandists, it certainly contributes nothing to our knowledge of the factors which contribute to the occurrence of dementia praecox in any individual case.

In summarizing the main results of our observations we may state:

1. The disease may present varying degrees of intensity, as do all other forms of disease. The ultimate effect will depend on the amount of brain tissue involved and destroyed. Some cases must undoubtedly be so slightly affected as to recover or never present evidence of mental disease sufficient to render its detection possible.

2. Some cases run a mild course and leave the patient in a state of mild imbecility. These are the cases which are produced as evidence of the congenital character of the disease, but they occur in patients who up to a certain age have been perfectly normal.

3. A considerable number are the subjectsof a severe acute attack. These usually terminate in a deep dementia. But the dementia is not progressive. The mental state may change as a result of readaptation to changing environment, but the deficiency consequent on the acute attack does not increase, unless there is a renewal of the disease. Intercurrent attacks of excitement and depression may occur, but these pass off without accentuating the dementia, and are to be regarded as a transient disturbance of equilibrium of the nervous system which had already adapted itself to its environment on a lower plane.

4. The disease may occur at all ages. It is quite wrong to imagine that it is exclusively or even predominantly associated with the adolescent period. In our experience the attacks may supervene between the ages of 25 and 35. Its incidence may be determined by the strain which is almost universally placed on the nervous system with the changes of puberty and the climacteric period. It may, however, occur in early youth, and it is an open question whether some of the so-called feeble-mindedness or early mental deficiency may not originate from the same source. We have further observed a typical case occurring in a woman of 56 years.

5. The fact that the patients recover from the active disease as a rule, and live for long periods (beyond the average age), renders it impossible to correlate the symptomatic evidence of the disease with *post-mortem*

findings. We have, however, seen two cases which died from intercurrent disease in whose brains the evidence of tissue degeneration was present. These will be described later.

6. Our main thesis—that dementia praecox is anatomically a brain degeneration, progressive over a very limited period, and on cessation leaving the nervous system in a debilitated state—suggests that if the process itself is to be further investigated attention must be confined to the condition which exists when the somatic disturbances of temperature, digestion, circulation, and other organic processes are most pronounced. It is only over that period that the factors which possess etiological significance from the research point of view are active. In the later stages when the dementia has ceased to progress, as is the case in the great majority of asylum patients, the forces which produce the trouble have already been spent.

## PSYCHASTHENIA.

BY

ALFRED T. SCHOFIELD, M.D., and R. MURRAY LESLIE, M.D.

IN medicine the class of disease that gives rise to the greatest diversity of opinion, and gives scope for the most prolific forms of nomenclature, is that of functional nerve diseases. Whether these are to be christened by their parentage or clinical features is still an open question. There are nowadays no physicians left, probably, who refuse to classify them at all, but many do so under protest, being perfectly bewildered amidst the weird assemblage of psychical and physical symptoms, and uncertain how to place them scientifically, Even the well-established disease that is so constantly before all physicians nowadays, called "neurasthenia," is considered by Dr. Collins (and, we doubt not, by many others) as "a clinical Colossus in the shape of a sphinx," and by Dr. Forel as an *omnium gatherum* of diseases thrown together under this title.

Progress in all that pertains to our knowledge of functional diseases of the nervous system is, without doubt, considerably retarded by an imperfect terminology, and the general term "neurasthenia" is made to connote practically all asthenic conditions quite irrespective of the particular portion of the peripheral or central nervous system that may happen to be affected. It would be more rational to sharply differentiate some of the groups of asthenia, although they may to some extent be correlated. It is surely inadvisable to place under the same category cases of ordinary nervous breakdown where the principal manifestations are emaciation, muscular debility, and incapacity for physical exertion with those other cases of asthenia of a cerebral type in which there may be no emaciation or muscular debility, but in which the manifestations consist almost entirely in diminished functional activity of the higher psychic centres, and characterized by deficient will power and self-control, defective judgement, and a general incapacity for mental work.

The name "psychasthenia" that heads this paper has consequently been more and more forced upon the notice of ourselves and other workers in the realm of functional nerve diseases as a means of lessening the size and improving the shape of this neurasthenic Colossus, and instead of leaving it a conglomeration of all abnormal nerve states, such as in the old days used to be vaguely dubbed "hysteria," to confine the name to a well-defined group of symptoms dependent on exhaustion of the nervous system.

Over forty years ago Beard invented the term "neurasthenia" for what used to be termed "the American disease."

Bauchet as long ago as 1857 described its symptoms, which are always those of weakness or overstrain. It is, as the name implies, a nerve weakness, and specially of the nerve centres in the brain.

Eichhorst, Dubois, and others deny that neurasthenia is a corporeal malady at all, and regard it as purely mental. Dubois declares that all neurasthenia is a form of psychasthenia, and argues that this is proved because its cure is ideogenic rather than somatogenic, with which opinion, however, we cannot agree, as we find physical treatment of all sorts of the greatest possible value in neurasthenia. It is, of course, true, as far as we know in our present state of ignorance respecting the true relations of mind and body, that no one can be merely physically ill, for in all cases there is a psychic element. This must not, however, lead us to overlook or deny the broad distinction that exists between a disease where the physical nerve centres are mainly at fault with one where the cause is the mind, of which they are but the instrument.

Neurasthenia may be, but is not always or even mostly, hereditary; and its exciting causes are nerve poisons of all sorts—malnutrition, fatigue, and overstrain—all of which are clearly of a physical nature and effect.

Before speaking of the necessity of distinguishing a certain well-marked class of these cases as psychasthenic, one may point out the distinction between neurasthenia and hysteria. We regard the former as principally of physical origin (and especially when we have taken away all the psychasthenic cases) and essentially a neurosis, and the latter psychic or a psychosis. It is, however, quite true that the symptoms of hysteria are more distinctly physical than in neurasthenia, though the origin of the former is an aberration or disorder of the unconscious (or subconscious) mind, while the latter is fatigue of the higher nerve centres. Neuromomesis, the most marked feature in hysteria, is not found in neurasthenics.

Having, then, already one well-marked psychic nerve disease in hysteria and a physical functional nerve disease in neurasthenia, it may well be asked; Is there any necessity for a further classification of psychasthenia?

Let us repeat again that in these functional nerve disorders which are grouped together merely by etiology and symptoms, where no pathological research is of value and no organic change known, no hard and fast lines can be drawn. Indeed, the very term "functional" is probably only an expression of the present state of our ignorance; for it is probable that no disease exists without some organic basis. In spite, however, of this difficulty, and the fact that many authorities, such as Sir T. Clouston, recognize only hysteria and neurasthenia, we are compelled clinically to separate off from the latter a certain group of cases and class them apart as psychasthenic.

In 1904 Dunin wrote a paper on the "Partial Passing of Neurasthenia," which had a great effect in America; and in 1906 neurasthenia was only diagnosed three times in the Massachusetts General Hospital.

Janet first proposed "psychasthenia" for a large class of cases hitherto called neurasthenic; and this is largely followed by American physicians as a necessity of clear diagnosis, though they are keenly alive to the evil of multiplying names. Professor Allbutt deprecates the use of the term, which is certainly not yet general in England, though we would submit of considerable value. One may arrive best, perhaps, at what is meant by "psychasthenia" by differentiating it from neurasthenia and hysteria.

Psychasthenia is mental weakness, and is related to hysteria, feeble-mindedness, and other psychoses.

Neurasthenia is weakness of the nerve centres, and is akin to cardiasthenia, myasthenia, etc. Psychasthenia is seldom solely due to exhaustion or nerve strain. Neurasthenia always is.

Neurasthenia is generally acquired, and seldom inherited. The term "neurasthenia" is so obviously incorrect in psychasthenic cases that the new term is a necessity, and Dr. Collins, Professor of Mental Diseases in New York, declares it would be very unfortunate if the two were again confounded.

Between psychasthenia and hysteria the difference is as follows: In psychasthenia the seat of the malady is in the conscious mind, in hysteria in the unconscious. The bearing of this may not be obvious to those unused to these terms, but it means that in the former the patient is cognizant of the weakness, while in the latter he is not.

In psychasthenia as a result there is no neuromomesis; in hysteria it is constant.

Psychasthenia is distinguished by being often (Dubois says "always") hereditary, and, therefore, more difficult to cure than neurasthenia.

There is frequently a family history of some mental disturbance or neurosis.

There is often a congenital cause, such as alcoholic poisoning of the germ plasm.

Psychasthenia may, however, be acquired by unhealthy

autosuggestion, or by prolonged masturbation (Courtney), or by profound shock. Courtney, however, goes so far as to say that not less than 75 per cent. are hereditary.

Its characters and symptoms are obsessions, a sense of unreality of things, delusions, phobias, loss of will power and concentration, doubts, anxieties, ideas of sacrilege, manias of cleanliness, order precision, compensation, expiation, and every variety of morbid conscience. Phobias may be of movements, objects, places, or ideas.

Psychasthenia is not so much exhaustion as maldirection, or imperfect action of the mind. It is, of course, increased when there is an inadequacy of the vital income to the vital expenditure, thus adding a physical cause.

The symptoms of psychasthenia are mainly mental, though there may be some physical signs; for instance, psychasthenia may lead to paraplegia. Such paraplegia is not classed as hysterical; there may be none of the signs of hysteria present. We may say in passing that we think we have had examples of all the symptoms we have enumerated, and have now under our care a marked case of psychasthenic paraplegia.

Professor Pierre Janet describes six varieties of psychasthenics: The doubter, the scrupulous, the criminal (homicide, theft, etc.), the inebriate, the sexual, and the excitable.

This class of case is becoming increasingly commoner, so much so that it may be definitely stated that it is psychasthenia rather than neurasthenia which is pre-eminently the disease of modern civilized life. Mental exhaustion is now far commoner than physical exhaustion, for the simple reason that the race in the modern battle of life is not to the physically strong but to the brainy.

The frequency of psychasthenia is quite as noticeable as the increase in insanity, and its immense importance may be gauged by the fact that in the opinion of our most distinguished alienists and psychologists there is no sharp line of demarcation between pronounced psychasthenia and incipient insanity. It can therefore be readily understood that the importance of diagnosing and treating cases of psychasthenia in their early stages cannot be overestimated.

The treatment of psychasthenia is difficult and tedious, and seldom gives those rapid and brilliant results that one finds in ordinary neurasthenia.

We must remember, too, that some use the term "psychasthenia" in a broader sense to include all forms of mental weakness and feeble-mindedness; and indeed, as all of us have some innate weakness somewhere, it is thus reduced to a question of degree; and physician and patient can here shake hands over a common failing.

It is pre-eminently in cases of psychasthenia that the patient's confidence must be won by the physician before any progress can be made in the cure of the malady. It is indeed the personal influence of the neurologist on the conscious, and still more on the subconscious, mind of the patient that is the main factor in the practical therapeutics of psychasthenia.

Hypnosis, which, however, is now, according to Bernheim, Milne Bramwell, and others, reduced to mere suggestion, is of considerable use, and claims a large success. Our experience, however, has not been altogether favourable in these cases. Suggestive treatment in the case of psychasthenics may be direct or indirect, conscious or unconscious. Each individual psychasthenic must be treated on the merits of the case; the direct method may suit one and be harmful to another, and similarly with the indirect method. In all cases rest is essential (sleep, relaxation, cessation from work), suitable environment, freedom from worry, isolation if necessary, and, above all, adequate nourishment of the fatigued brain cells by sufficient pabulum. If there is general malnutrition of the body this must be corrected and modified, Weir Mitchell treatment be administered as in the case of an ordinary neurasthenic, while one or other of the suggestive methods of treatment may be utilized as an auxiliary. At all costs the vicious circle that has been established must be broken.

The physical condition in all cases undoubtedly should be raised to the highest state of efficiency, broad hygienic social relations should be established, the mind diverted and hygienically occupied by suitable employment, preferably of an altruistic nature—philanthropic or religious.

Such, then, are a few notes on this variety of neurasthenia that we desire to establish definitely as a distinct entity under the title "psychasthenia," as suggested by Janet; and we believe that increased clearness in diagnosis and treatment will result.

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## RE-EDUCATION OF THE ATTENTIVE CONTROL.

By H. Crichton Miller, M.A., M.D.

Most physicians will allow without hesitation that the subjective factor bulks far more largely in disease to-day than it previously did. Where our fathers earned their living off small-pox and enteric, we are reduced to phthisis and neurasthenia, and our sons will have to do without phthisis. But if the psycho-neuroses continue to increase at the present rate, our sons will not starve. In spite of this increase it must be allowed that we still tend to group morbid symptoms into "real" and "imaginary," and that most of us fail to realize the immense range of symptoms in which we should take account not only of the organic basis of the symptom, but also of the subjective value put upon that symptom by the patient. Instead we are apt to treat respectfully the organic basis and then to class the residue—the subjective exaggeration or prolongation—as "mere imagination." We fail more often than not to appreciate our duty, which is to train the patient to such mental habits as will enable him to apprise his own morbid sensations at something nearer to their face value.

The aim of this paper is to emphasize the psychic factor which is responsible for the undue inflation of the subjective value of our sensory experiences, and to point out the necessity for treating it and to indicate some suitable methods. We are all ready to admit the paramount importance of attention in our scheme of school education, but we sometimes fail to realize that the child who finishes his school education without having acquired an adequate degree of attentive control might as well have stayed at home, and that it is merely a chance whether in after-years he will fall into the hands of the magistrate or the physician for a course of re-education.

I submit, then:

1. That attentive control is the one aim of all true education.
2. That our educational system is attaining this object less successfully now than previously; and
3. That when failure of attentive control manifests itself in later life as ill health it falls to the physician to correct it.

Now, I daresay it will be objected that I am using attentive control as synonymous with will power. I reply by asking how will power is manifested apart from attention, and it is possibly because we have failed to realize this fact that we have done so little in the line of re-education. We say of our neurasthenic, "He is the victim of indecision; he cannot make up his mind on any subject; he has lost all will power;" but we do not appreciate the fact that if he regains control of his attention all these symptoms disappear. The tendency, in fact, of modern psychologists—and we may take men of such different standpoints as Ribot, Stout, Münsterberg, and McDougall—I say the tendency among them is to make will and attention synonymous; some of them say it, some of them only imply it. But modern psycho-therapy must accept it if it is to be of real value to a very large class of sufferers, and one which seems to be increasing at an alarming rate. Twenty years ago they were called hysterics; since then they have generally been referred to as neurasthenics, and now the fashion is to glorify them with the title of "psychasthenics." I will not give them a name because the question of diagnosis and terminology is not germane to my subject, and it will be dealt with in another paper before this Section. I shall use the non-committing term of "neuropath," being convinced that the members of this Section will recognize the type I refer to, and that they will not accuse me of wanting to re-educate indiscriminately all neurotic subjects. The individuals I refer to are chiefly women of ease and leisure; their education has been a failure, in the only true sense of education, owing either to unwise pampering by their parents, or insufficient discipline from their teachers. As children they

were said to be wilful or unmanageable, but in adult life they have become nuisances, not only to other people, but as much, and perhaps more, to themselves. Huxley defined the aim of all true education as follows: "To enable us to do the things we ought to do, when we ought to do them, whether we like them or not." He might well have extended his definition to thought as well as action. Münsterberg says: "Mere learning is no substitute for training of mental energy. Habitual rushing to new and ever new impressions may easily interfere with the development of persistence in character. Whether the will is allowed to start on one thing and then to be pushed to something else, or whether it is forced to hold on against all difficulties, makes the difference which counts for life. . . . An education which spoils the mind and never demands real effort, which simply follows the likings and interests, leaves the adolescent individual in a flabby and ineffective state. On the other hand, the training of attentive control ensures strength in any sphere, even though the gifts be small. . . . The mind that has learnt to resist distractions can hold its own in any field."

Aiken says: "I would define education—moral and intellectual—as attention."

Our notion of the relation between mind and body is so inverted that to tell a nervous invalid that his bodily ailments are due—at any rate in part—to mental causes, seems to him a gross underrating of their importance, yet the very same invalid may eagerly insist on "the supremacy of mind over matter," but not in his own case.

There is great necessity for the better understanding and disciplined training of the temperament which we contemptuously dub "neurotic" and generally allow to run to hopeless and irretrievable waste. When this temperament is accompanied, as it is not infrequently to a surprising extent by strength of character, it is capable of performing excellent work.

Then there is the artistic temperament. The artist lives by non-voluntary attention; his work demands a wholly different mental attitude to that of the lawyer, teacher, doctor, etc. *We* have to live by work which depends on conative attention; the associations of our minds must be continually selected if they are to produce good results. His associating mechanism will not produce "inspired work" if he controls it too much.

*Poeta nascitur non fit*, turned from a Latin epigram into a psychological aphorism, runs thus: The poet's associating mechanism is part of his ancestral inheritance; it cannot be developed like attentive control.

The artist, then, *quâ* artist, has little control over his attention; if we try to develop that control we may spoil a good artist in trying to make a better citizen or a better patient. At the same time, we are bound to confess that the artist is generally so devoid of the power of determining his own area of consciousness that he is apt to be the victim of moods, of obsessions, of phobiae; a helpless victim in the grip of the most trivial abnormality of peripheral nerve stimuli. Shakespeare opined that the philosopher cannot "endure the toothache patiently." Lord Haldane differs, and says "he ought to do if he does not. At all events, he should endure it better than other people." If Shakespeare meant by philosopher the genus artist, I am convinced that Lord Haldane would not have challenged the truth of his statement.

In short, there are temperaments which, from the point of view of working efficiency, need the maximum attentive control available, and there are others—few, of course—which do not, but from the social and therapeutic points of view none can have too much.

It now becomes necessary to consider in some detail the views of attention offered by modern psychology. Roughly speaking, there are three descriptive and three explanatory theories:

A. *Descriptive.*

1. As motor. (Ribot.)
2. As sensory. (Bastian, Sully, etc.)
3. As sensori-motor. (Wundt, Waller.)

B. *Explanatory.*

1. As facilitation of ideas.
2. As inhibition of ideas.
3. As both.

Ribot's view, which cannot be passed over because it is Ribot's, is that the muscular accompaniments *constitute* attention *plus* the objective side—that is, the state of consciousness which results. "Our only possible conception of will" is our idea of the action of the voluntary muscles. The obvious criticism of this view, made by McDougall, Stout, and others, is that an inseparable concomitant is not *ipso facto* a constitutive element of any phenomenon. The sensory description is equally extreme, but on the face of it less startling. Marillier expresses it thus: "A state of consciousness which is the result of the temporary predominance of one representation over the representations which are co-existent with it at any moment." According to this description, the original sensory excitation is reinforced by sensations caused by the muscular changes, which are themselves the result of the first excitation.

All one can say of this view is that it is more plausible than satisfying. We are driven to accept the mixed definition of attention as a sensori-motor phenomenon as laid down by Wundt, Waller, Külpe, and others. It is sensory in its contents, motor in its manifestations, and sensori-motor in its whole process.

Turning to the explanations, we have, first, the one-sided one of facilitation of ideas offered by Müller and others. Müller states that attention reinforces its object in three ways:

(*a*) Adaptation of a sense organ.

(*b*) Facilitation of excitation corresponding to stimulus in central nervous systems.

(*c*) Recollection of similar ideas previously experienced.

This explanation does not satisfy the man who realizes his own power to inhibit ideas.

Wundt goes to the other extreme and lays stress entirely on the inhibiting side of attention. He divides the process into two essential and two non-essential factors. The two essential are:

(*a*) Increase of clearness of definite idea, or group of ideas, accompanied by the feeling which is characteristic of the whole process from the beginning. (This factor Külpe rejects.)

(*b*) Inhibition of other available impressions or memorial images.

The two non-essential factors are:

(*c*) Sensation of muscular strain with the sense feelings which belong to them and which intensify the primary feeling.

(*d*) Intensification of the sensory contents of the apperceived idea by these strain sensations through the medium of associative coexcitation.

As regards (*a*), Wundt draws a special distinction between intensity and clearness, so that the limen of intensity and limen of clearness are not to him the same thing. The limen of intensity is equivalent to the threshold of consciousness—that is, we perceive only what rises above the level. On the other hand, the limen of clearness is the threshold of attention—that is, we apperceive only what reaches this higher level. The two processes to Wundt are independent though they may exert a certain influence on each other.

As regards Wundt's second factor—the inhibition of all impressions and memory images except those attended to—it has been associated by its author with the frontal lobes, the so-called "apperception centre." Naturally this has opened an easy line of attack for his critics (Münsterberg, Bastian, etc.), who charge him with having created a "faculty of attention," and of having located it in a definite region of the brain. Wundt replies that there is no "attention as such" but only "ideas attended to," and changes in ideas which constitute our "attending" are accompanied by physiological processes primarily in the frontal lobes. We must in any case admit that definite physiological conditions of a central character must be assumed as an invariable feature of the attentive process.

Finally, we come to the third explanation of attention as a combination of facilitation and inhibition of ideas. Exner is the chief exponent of this view, which certainly is the most satisfactory to the common-place man. He compares the inhibition to that of reflex action, in which an adequate stimulus can be prevented from provoking response by a higher centre.

Münsterberg's "working theory of attention" is a modification of Exner's. He regards attention as an act

of will; the entire process is dominated by the end in view, which is the unfolding with greater vividness and clearness of the given content. On the other hand, every act of will is an act of attention, in that the mechanism of a voluntary act is not conscious, but it is made possible by the apperception of the idea aimed at. To the practical psycho-therapist this is the view which naturally commends itself.

From all these views, mutually antagonistic as some of them are, there stand out the following points:

1. From the physiological standpoint the process is a sensori-motor one.
2. From the psychological standpoint it involves the facilitation of one idea with a corresponding inhibition of others.
3. The limen of intensity is distinct from the limen of clearness.
4. In practice we may regard attention and will as equivalents.

From the therapeutical point of view, we can now see the practical bearing of attentive control on subjective symptoms. The power to facilitate an idea is proportionate to the power to inhibit other ideas. The more absorbed the philosopher becomes in his book, the more patiently does he endure the toothache. In other words, to succeed in keeping the limen of clearness high implies a corresponding difficulty to apperceive a competing idea, and a probably proportionate difficulty to perceive it. But if the philosopher's toothache is constant it becomes obvious that the inhibition of its apperception depends on the degree to which he is interested in his book. In other words, we come to the question of pain and pleasure as determinants of attention. Sully looks upon all interest as a determinant of attention, while Stout maintains that interest is merely the result of attention. To most of us Sully's view will appeal forcibly. The power to endue an uninteresting task with interest is doubtless the function of the attention, but the very choice of an uninteresting task which involves considerable effort implies the existence of a more interesting and attractive task. Certainly Huxley could not have framed his definition of education if he had held Stout's view of interest as indissolubly connected with attention. In practice it will be found that patients who always ask for exercises that are less of the nature of drudgery are the ones that need those exercises most. The music student who is anxious to get on from five-finger exercises to sonatas is generally the one that needs the exercises most and is the least fitted to cope with the sonatas. In short, the individual who is best able to ignore painful sense stimuli is generally the one who can best maintain his attention on a subject that is not intrinsically interesting to him. This, then, is the practical quality that we want to cultivate in our neuropathic patient—the power of being able to determine his own area of consciousness, and that with the least effort compatible with certainly. The *malade imaginaire* keeps the threshold of his consciousness so low as regards his organic sensations that he is never without some sense stimulus sufficiently abnormal to enter his consciousness and to constitute a subjective symptom.

One more point must be mentioned before I pass to the more practical part of my paper. There seems to me to be a definite difference between concentration of the attention and mere fixation. The difference is most clearly marked when we discuss sleep. Obviously fixation of the attention is one of the essential conditions of going to sleep. The mind that gives itself up to an endless pageant of ideas represents one of the best known types of insomniacs. On the other hand, concentration and sleep are incompatible. I presume that Stout and Shand would class this phase of attention under their heading of non-voluntary as opposed to voluntary (which is equal to concentrated attention) and involuntary (which is equivalent to spontaneous). I merely mention this point because a great many victims of insomnia find this a real difficulty; they oscillate between a vacuous condition of spontaneous attention and a strained state of conative and concentrated attention.

### *Methods.*

There are two methods which are so popular as hardly to need mention—bodily relaxation and rhythmic breathing. But they may well be referred to in order that we may appreciate the exact psychological significance of such simple procedure.

Relaxation of body and cessation from any voluntary muscular contraction has two effects. In the first place it stops the numerous leaks of nerve energy with which our usually restless life is filled. To take McDougall's standpoint for a moment, it allows our nerve potential to rise for use in a given direction. We instinctively inhibit voluntary movements when our attention is intensely concentrated. As Stout points out, "Even the slightly disturbing movements due to breathing are inhibited, and we express this truth in the phrase 'breathless attention.'" James also has some excellent passages on this subject in *Talks to Teachers*. Now this inhibition must at first be a voluntary thing, and as such it demands attention. Therefore we make an effort of attention to inhibit voluntary movement, and thereby we attain the relaxed bodily condition which favours voluntary attentive control.

Münsterburg puts it thus: "Suppression of opposing movements secures inhibition of interfering thoughts. Shiftless minds are more directly forced into service by systematic control of motor response. Misapplication begins if motor activities, or even control of motor activities, are reinforced in such a way that they themselves enter into the centre of attention." The actual technique of relaxation is too simple to need description.

Rhythmic breathing is the other well-known method of developing psychic control. It has been practised by Yogi teachers for three thousand years; it forms the basis of all the New Thought cult; it is the kernel of all the quack "How to succeed" systems; and though its value is put down to absurd and fantastic explanations, it yet remains obvious that it is of some value, and it is for the psycho-therapist to analyse it scientifically and to use it rationally. Normally we breathe automatically, and under given conditions the individual's type and rate of breathing is constant. Any deviation from this type and rate must be effected by voluntary effort; in other words, the automatic act must temporarily be made volitional. This demands no effort of concentration, but it requires constant fixation of the attention. The moment the attention is distracted, the breathing tends to revert to the automatic rate and type. It is obvious, therefore, that any predetermined type of breathing—slow, deep, with a pause, etc.—will serve the purpose, and that it is not the particular type of breathing that has the magic of effect, but merely the necessity for sustained attention, with the object of keeping up a certain type of breathing. It is interesting to reflect that the most skilled and enthusiastic "deep breather" can never attain voluntarily the perfection of rhythm which characterizes his breathing when he is pleased to leave it alone!

I hope I have said enough to make it clear that these two popular practices — namely, relaxation and deep breathing—though they are and have been exploited by magicians and quacks, are none the less of real value, and, further, that their value is based upon elementary psychological laws.

We come now to somewhat less commonplace methods, and here I should like to point out the very important difference between exercises which aim at holding the attention with the minimum of effort and those which demand effort. The former are useful to prevent introspection and to "raise the threshold of consciousness" for the time being. The latter are developmental and more educative in their aim. A scholar who has broken down after an examination requires to make no effort of attentive control; he has probably proved his ability not only to control but to abuse his attentive powers. At the same time it may possibly be essential to prevent opportunities of introspection, and for him light literature, games of patience, and jig-saw puzzles ought to be indicated. On the other hand, the leisured society woman, who has never in her life attended successfully to anything less absorbing than a comedy or a horse-race, may well be ordered a variety of exercises which, being intrinsically less interesting, demand a much greater effort of concentration. The following examples are arranged in the order in which they demand concentrative effort, beginning with the easiest:

1. *Pointing* with outstretched arm or leg at a suitably placed mark. The co-ordination of some individuals will render this a very easy exercise, while others will find it

very hard to steady the limb. It is generally harder than the patient supposes, and therefore useful from a "humbling" point of view.

2. *Balancing* is a very similar exercise; at first it demands the most undivided attention, but as skill is acquired the patient can converse or think of other things. When this point has been reached, the exercises cease to be of use. A stick balanced on the finger is the form usually adopted, but balancing a suitable object on the head is an even better form.

3. *Letter games* (word-making) are fairly interesting, and if the element of speed is always present they are extremely useful.

4. *Reading a book upside down* is useful, as it is an exercise in which the patient's improvement can easily be gauged. The time taken to read ten lines of a given book in this way can only be reduced if the individual progresses in thought control.

5. *Writing with two hands* is very useful, and the improvement acquired after a fortnight's daily practice will encourage the patient.

6. *Recognizing words spelt backwards* is an exercise which baffles a great many patients, chiefly because of the difficulty of waiting to the end of the spelling before attempting a solution.

7. *Writing or drawing* with the eyes fixed on a looking-glass in which the paper is reflected is much the same as No. 5.

8. *Describing accurately* an object or picture which has been examined for a limited space of time introduces the element of memory, but it is most valuable for developing the powers of observation.

9. *Detailing a number of articles*, say ten to twenty, exposed for a short time, is much the same as the foregoing exercise, but observation counts for less and memory for more.

10. *Counting* with the eyes fixed on a given spot. This is an exceedingly difficult exercise, and perhaps one of the most illusory. Any one who is satisfied with his powers of concentration would do well to try to count to himself up to 100, slowly and without moving eyes or lips, and at the same time without allowing a single extraneous thought to occupy his consciousness for a moment.

11. *Following with a pin* the second hand of a watch is a particularly good exercise. It was devised by a patient of mine suffering from train phobia, who, in the first days of his travelling alone, used to banish the old phobia by frantic efforts to keep up with the second hand of his own watch.

12. Finally, I would recommend as, perhaps, the best all-round exercise the *stroking out of a given vowel* from a column of the newspaper. Münsterberg, McDougall, and others consider this of great value. The exercise should be carried out with a view to three points:

1. Accuracy.
2. Speed.
3. Ignorance of contents.

The patient should be given a column of equal length every time. Speed and accuracy can be noted and improvement gauged thereby, but it is surprising how long the most conscientious pupil will take to acquire the power of finishing a column without knowing what the text refers to. It is desirable, but not so feasible, to alternate this exercise with its converse—namely, reading an article with the attention riveted on the subject with a view to ignoring misprints. This is the student's gift as opposed to the proof-reader's knack which is developed by the first form of this exercise.

In connexion with these exercises, reference must be made to Vittoz's most valuable work. It is marred by certain startling and unscientific theories, but none the less the value of his exercises cannot be gainsaid. He gives five classes of exercises for concentration:

1. The symbol of infinity or the figure "1."
2. The ticking of a metronome.
3. The tactile sense.
4. Affected parts of the body.
5. Ideas.

With regard to the first, it is often useful in conjunction with breathing exercises, as the patient fits his respiratory movements into the concept of the symbol. The second consists in resisting the fatigue caused by monotony.

I have attempted to sketch out very briefly the necessity for re-educating the attentive control of many of our patients and to outline some of the methods. I am conscious of the imperfections of a paper which has necessarily had to be compressed into appropriate limits. I trust that, if I have failed to be exhaustive, I may have at least directed your attention to a subject which does not often enter the limen of the physician's consciousness.

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## THE NUCLEI OF THE NEUTROPHILE CELL IN ACUTE INSANITY.

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AT a time when increasing importance is attached to the examination of the blood of the insane, it may be of interest to give the result of some observations made during the past few months.

Although the white cell has again been the special object of examination, this communication does not deal with its variation in kind or number, but with the condition of the nucleus.

The nucleus of the so-called polymorphonuclear, polynuclear, or neutrophile leucocyte is a body which may be composed of one or more lobes. The majority of authorities agree that the division is rather a multilobular one than a multinuclear. The young cells are those with only one or two nuclei; the older cells have three, four, or five. Arneth, using this fact, considers that the young white cells, those with one or two nuclei, are less resistant and less able to combat an infection than the older ones with more nuclei.

He counted the number of the nuclei of the neutrophile white cells and divided them into five great classes. Placing these numbers in a horizontal row beginning on the left with Class I, which contained cells with only one nucleus, and ending on the right with Class V, which held the cells with five nuclei, he formed what he called the "neutrophilic blood" picture. Thus from a count of fifteen normal individuals he formed the following normal picture:

| I. | II. | III. | IV. | V. |
|---|---|---|---|---|
| 5 % | 35 % | 41 % | 17 % | 2 % |

Miner and Ringer, whose articles in the *American Journal of Medical Science* first attracted my attention to this subject, and to whom I am indebted for some of the facts quoted in this paper, made the following blood picture from ten healthy men:

| I. | II. | III. | IV. | V. |
|---|---|---|---|---|
| 2.5 % | 16.2 % | 55.6 % | 18.6 % | 5 % |

It will be noted that there is a marked discrepancy between the records of these two observers. The cells in Classes I, IV, and V, however, coincide fairly well, but in Classes II and III there is considerable disagreement. This, no doubt, is due to the difficulty there is to decide what actually must be considered a connecting strand in the nucleus and what must be considered as a separate nucleus. This matter will be again referred to at a later period. In order to obtain figures which could form graphic curves when tabulated upon a chart, a method was devised by which the cells in Classes I and II and 50 per cent. of the cells of Class III were added together. This is only an arbitrary method, but it serves the useful purpose of establishing a certain numerical standard to which the name of "index" has been given. By this method Arneth's index was found to be 60.5, while Bushnell and Trueholtz found a normal index of 67, Webb and Williams one of 65, Miner and Ringer 48.5. I examined the blood of a dozen healthy individuals and my index came to 57.

Perhaps it would be well to describe very briefly the technique of this work. The blood is drawn from the lobule of the ear, and the resulting drop touched with an ordinary glass slide; another slide is then placed against the drop of blood, and when the blood has run along its edge it is slowly drawn at an acute angle. The resulting film was then dried and stained by Jenner's method. As a general rule the next procedure was to examine the nuclei of a hundred cells under the oil emersion lens. It must be

admitted that the personal equation may enter very largely into the results that are obtained, but I think it is greatly diminished if the observer is a constant one and no other person is allowed to help in the blood counting. It is not always easy to decide into which class a cell shall be placed, and at times, more especially in the experimental part of my work, difficulties were met with, but following the rule laid down by Miner and Ringer, the following plan was adhered to: (1) Nuclei connected by a distinct isthmus are always counted as one nucleus. (2) Nuclei connected by only a thread are counted as two nuclei. In order to prevent a "complex" entering into the counts, and to minimize the personal equation as much as possible, the blood films were prepared by another person and marked so that the enumerator should not know whose blood he was examining.

This procedure was continued until I satisfied myself that a constant mode of the enumeration of the model had been established in my mind. In addition to this no chart was formed of the cases under examination until the whole investigation was complete. However unreliable or inaccurate these results may be, at any rate they have been obtained honestly and free from the influence of any preconceived theory. A great deal depends upon the thinness of the film, and another point of importance is that the blood stain must be fresh. Thick slides make accurate emmeration of nuclei impossible.

Following the observation of the blood of normal individuals, the nuclei of cases of chronic insanity were noted with the result:

| I. | II. | III. | IV. | V. |
|---|---|---|---|---|
| 5.7 | 29.5 | 45.8 | 16.8 | 1.6 |

The resulting index is 57.8, which closely corresponds to my normal blood picture of 57. The subjects of this part of the investigation were all women in good general health, and included cases of paranoia, chronic mania, and melancholia and organic dementia. The next step was the examination of patients suffering from acute mental disorder. This was done by counting the cell nuclei of each female patient admitted who was the subject of an acute attack of insanity. The resulting neutrophilic index was 64.6. The count was the result of the examination of 10 cases, of which 2 were not first attacks.

In one case it was the patient's eighth attack and the index was 41; in the other it was the woman's third admission, and here the index was 51. These facts are mentioned because they direct attention to a similar phenomenon regarding leucocytosis in recurrent cases—namely, that the leucocyte count is low in recurrent cases of insanity.

Having satisfied myself that there are changes in the nuclei of the leucocyte in acute as compared with chronic cases, a systematic series of observations was commenced on three cases of acute insanity.

The subjects were chosen because they were typical of their kind and the symptoms were active.

### Case I.

E. P., aged 37, married, had a baby a week before admission. The breasts were full of secretion and the patient much run down. She was suffering from excitement with confusion, was noisy, excited, restless, and disorientated.

The blood in this case, as in the other two, was examined every second day, in this case for nearly two months and a half. The first blood count was as follows:

| I. | II. | III. | IV. | V. | Index. |
|---|---|---|---|---|---|
| 17 | 38 | 37 | 8 | 0 | 73.5 |

The index fell at the end of four days, but then rose, till at the end of a fortnight it had reached 82.5. At this time the patient had to be tube-fed and catheterized. She slowly began to improve, and the index fell to 69.5, twelve and a half points above my normal. A week later she was not so well, a detailed blood picture reading thus:

| I. | II. | III. | IV. | V. | Index. |
|---|---|---|---|---|---|
| 14 | 41 | 31 | 13 | 1 | 70.5 |

Four days later she was much the same, and a differential qualitative leucocyte count read as follows: Polynuclear, 71 per cent.; large lymphocytes, 6 per cent.; small ditto, 10 per cent.; hyaline, 4 per cent.; and eosine cells, 9 per cent. This count is interesting, as it clearly points to the favourable nature of the prognosis as demonstrated by the marked eosinophilia. After improving a little, she relapsed and was emotional, and lost much confidence in herself; the index meanwhile rose to 81.5, the differential count being:

| I. | II. | III. | IV. | V. |
|---|---|---|---|---|
| 27 | 42 | 25 | 5 | 1 |

This rise of the neutrophilic index is not unlike the rise that occurs in leucocytosis. Gradually the index fell till it reached 70; at this point the reading was thus:

| I. | II. | III. | IV. | V. | Index. |
|---|---|---|---|---|---|
| 10 | 43 | 34 | 11 | 2 | 70 |

This count shows the interchange that is taking place in the numbers of the cell nuclei, how that Classes I and II are diminishing and Classes III and IV are increasing. A week later the patient was mentally recovered; the last blood count taken previous to her discharge read:

| I. | II. | III. | IV. | V. | Index. |
|---|---|---|---|---|---|
| 17 | 28 | 35 | 7 | 3 | 62.5. |

When the graphic curves of a chart based on this case are studied, the point that strikes one most is the rises of the index, each rise rather less marked than the previous one.

It could not be said that they in any way corresponded to any particular mental state. They appear at regular intervals in this case, and no doubt are the response of the leucocytic mass to a call on the part of the organism for help to overcome a toxin.

### Case II.

A. E. G., 29, married. She was very agitated on admission. Had recently been confined, and had considerable mammary secretion. She was very pale, anaemic, and unhealthy looking. The mental symptoms were those which are usually described under "agitated melancholia." Restlessness was constant, there were hallucinations of a terrifying nature. She never spoke, but crouched in towards the wall when addressed, and was spoon-fed. The blood of this patient was examined every second day for nearly four months. There was a history of a refusal of food for some days before admission, which may account for the low counts of 60 made upon admission and the second day after admission. At the end of a week the following blood picture presented itself:

| I. | II. | III. | IV. | V. | Index. |
|---|---|---|---|---|---|
| 15 | 40 | 35 | 8 | 2 | 72.5 |

Two days later the index rose to 79.5, and, with the exception of a fall to 72, remained at about this figure. Meanwhile the patient remained in bed; she was very agitated, unhappy, restless, and she never spoke. The neutrophilic index remained high, and a little over a month after admission it had reached 81.5; the detailed count being:

| I. | II. | III. | IV. | V. |
|---|---|---|---|---|
| 28 | 41 | 25 | 6 | 0 |

During the next month no marked change took place in the blood counts; the more acute mental symptoms, however, began to subside, the patient was now up, and, though still agitated, she had spoken and made an attempt to fold a bed.

The next month saw little change in the index, it remained high, and was usually between 78 and 82. The woman gradually lost the active agitation and unhappiness, but picked her face and chin, and was very indifferent to her surroundings. At the end of three months the index reached its maximum—namely, 87. At this time she had a count of 80 or over on six successive examinations.

The cells in Classes I and II remained very high. Blood counts continued to be taken even when it was seen that the prognosis was probably one of dementia. The index remained high, and a detailed account of the last examination read:

| I. | II. | III. | IV. | V. | Index. |
|---|---|---|---|---|---|
| 32 | 42 | 18 | 8 | — | 83 |

Speaking now, at a time when the disease has been in progress seven months, the patient's mental condition is

that of dementia, she is dull and indifferent, automatic and quite idle. The points that are of interest in this case are, first, the high neutrophilic index continued over a long period of time; and, secondly, there is no secondary rise of the index as seen in the first case, but rather a systematic and gradual ascent with no tendency to fall.

Case III.

J. F., single, 41, farm servant. For the first two days after admission she was agitated, unhappy, and refused all food, and was fed by the nasal tube. Two days later she was confused and excited, noisy, abusive, and violent; this stage was followed at the end of a fortnight by a period of mild restlessness. The patient could not read or write, and her answers to questions were not very satisfactory; but a poor education, no doubt, is a factor in determining her weak-mindedness. A blood count taken the morning following admission was as follows:

| I. | II. | III. | IV. | V. | Index. |
|---|---|---|---|---|---|
| 26 | 42 | 27 | 5 | 0 | 81.5 |

The index during the next three weeks remained very high—with two exceptions, 80 or over—until it reached 87.5, and in two days later it mounted to 88. Now this is the highest neutrophilic index that occurred in any of the patients examined. These two very high counts, together with the subsequent fall of index, certainly simulate the crises referred to in the first case. The index again rose to 85.5, and then fell till it reached its minimum, 75.6, when it again rose to 85, this rise being followed by a fall and a week later another rise. The descent of the index was, after the two first marked crises, more or less suggestive of a "ladder" lysis.

The last count, taken at the end of nearly three months, showed the index to be 81. Throughout the illness it will be noticed the counts have been abnormally high. The mental state of the patient was certainly acute at the commencement of her illness, but her general condition did not suggest the absorption of much toxic material. After the first fortnight the patient's mental condition slowly returned to normal. She had an occasional slight return to restlessness and mild excitement, and she was inclined to be emotional, but, viewed broadly, she made an uneventful recovery. There is now a considerable amount of mental defect, but this is certainly congenital, and the woman has made, as far as she herself is concerned, a good recovery. Reviewing the figures obtained in the examination of these three women, it would be wrong to draw too sweeping conclusions from the amount of material, but one or two points can be made out.

Undoubtedly the nuclei of the leucocyte undergo changes in acute insanity. At the commencement of an attack of acute insanity, the leucocytes found in the blood have a tendency to possess a single or bilobed nucleus. It is unusual to find neutrophile cells with more than three nuclei, and though cells with four occur they are rare; cells with five nuclei are even rarer. As the attack progresses, the leucocytes in Classes III and IV gradually increase in number at the expense of the cells in Classes I and II. Cells containing five nuclei were practically absent in the last two cases which were systematically examined.

Comparing the charts, it will be seen that whereas in two cases there is some apparent system in the rise and fall of the index, in the third there is no such systematic arrangement. We also see that in the cases that recovered the count was high to start with, and then came down; whilst in the woman whose attack ended in dementia the reverse occurred. In the course of her illness, instead of commencing high, the first two indices were only 60, and the count rose at the end of three months to its maximum. It might be said that in one case we are dealing with mania, and in the other with melancholia, and that is admitted; but as yet the pathogenesis of mania and melancholia has not yet been clearly defined.

When the number of cases examined in a systematic manner is so small, it is perhaps premature to attempt to draw conclusions of a definite nature; but enough, I think, has been done to show that by Arneth's method we may form some opinion as to the response an acutely insane person is making to eliminate a toxic material.

# SECTION OF DISEASES OF CHILDREN.

Mr. Robert Jones, President.

## AN OPERATION FOR WEBBED FINGERS.

By A. H. Tubby, M.S.Lond., F.R.C.S.Eng.

The fact that many operations have been devised to remedy this congenital deformity testifies to the inherent difficulties of obtaining a successful result.

At this moment I need not try your patience by describing to you various types of webbed fingers—suffice it, however, to say that they are four in number: (1) Those in which the fingers are joined by skin throughout—a very rare form, and susceptible to simple treatment, if care be taken; (2) union by skin and fibrous tissue through a varying length of the interdigital cleft; (3) the interesting "lattice form," in which the fingers are separated proximally, but united distally; (4) where the bone or other tissues are partially or completely fused together.

Difficulties arise chiefly in those instances where the union is by soft tissues as well as by the skin, and where some of the bones are joined; but very intractable and troublesome are those cases where each phalanx is completely blended with its neighbour. My remarks, however,

Fig. 1.—At A a triangular flap is cut on the palmar surface with its apex upwards. At B a second flap is cut on the dorsal surface with its apex downwards. The flaps consist of skin and subcutaneous tissue. The deeper tissues of the web within the limits of the flap are excised, and each flap is passed through the gap and its tip secured by sutures. (Figs. 1, 3, 4, and 5 were drawn by Mr. E. Rock Carling.)

are chiefly directed to union by soft tissues, and to union by some of the bones, but not all. Fortunately the last-named are as rare as they are troublesome.

Many methods of permanently separating webbed fingers have been devised, and they all have certain points in common which will be mentioned presently. One method is primitive in its simplicity, and entirely objectionable in its results. It consists of dividing the web, and then suturing together, at the base of the web the dorsal and palmar surfaces of the epithelium. If this were always possible the desired result would be quickly and easily achieved. It is not so, however, because the fingers are so closely placed together, and the thickness of subcutaneous and fibrous tissues is such, that the epithelial surfaces cannot be brought into apposition, with the result that granulation tissue appears and the web is re-formed. Another method is the insertion of a silver pin or some foreign body through the base of the web and its retention there until an epithelial-lined fistula is formed. This event rarely happens, except in the entirely membranous types; and even if it does so it is found that whilst healing is taking place the pin, and with it the fistulous opening, is

travelling slowly away from the bases towards the tips of the fingers; so that some of the web is left. More elaborate methods have been designed by Zeller, Félizet, Didot, Norton, and Forgue

To all of these operations certain objections are inherent; for in one or other particular they fail to fulfil the postulates of success, which may now be briefly enumerated. They are:

1. The formation of a permanent and large opening or fistula at the base of the cleft, and the significance lies in the word "large." This opening must be completely lined with epithelial tissue, and be in the position and have the natural direction of the interdigital cleft.

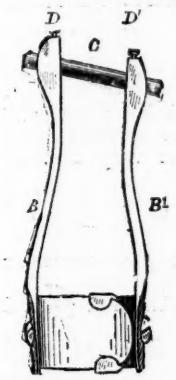



Fig. 2.—The author's apparatus designed to keep the glass rod in place and prevent it being forced by granulations towards the tips of the fingers. (From a drawing made by Mr. B. White, of Westminster Hospital

2. The fistula so formed must be stationary—that is, it must show no inclination to travel downwards.

3. No attempt should be made to deal with the remainder of the web until the fistula is completely healed.

4. When it is, the web is dealt with in such a way that the lateral raw surfaces become completely covered with skin.

5. Absolute asepsis from first to last is essential to success.

6 The fingers, when healed, must be watched and splinted, if necessary, to prevent any lateral deviation. They should also be massaged and moved daily to increase their suppleness.

In order to satisfy these requirements I have practised in several difficult examples of webbed fingers, where the union by soft tissues and by some of the bones as well was present, a form of operation the details of which are as follows:

Two triangular flaps of skin and subcutaneous tissue are cut. One is made on the palmar and the other on the dorsal surface. These are in the situation of the normal interdigital cleft. The palmar flap A (Fig. 1) has its base towards the tips of the fingers, and its apex pointing upwards, whilst the dorsal flap B is cut in the reverse direction. The dorsal flap is cut higher or more proximally on the hand than the palmar, because of the slope of the natural web from below backwards and upwards; and these flaps are large and generous, as it is found that a surprising amount of tissue is required to line thoroughly the surface of the foramen about to be made.

Fig. 3.—A glass rod, C, is passed obliquely through the gap, after the skin flaps have been sutured so as to line it.

In making the foramen at the base of the web a mere incision is insufficient. The soft tissues must be cut out until a clean circular opening, at least one-third of an inch in diameter, is made. The next step after the arrest of haemorrhage by forci-pressure, and not by ligatures, as the latter interfere with the healing process, is to draw each flap through the foramen, adjust them carefully with their epithelial surfaces opposed and looking towards the centre of the foramen, and fix them thus: The tip of the palmar flap is sutured to the lower edge of the dorsal aspect of the foramen, and the tip of the dorsal flap is fixed to the upper edge of the palmar aspect. Fine silkworm gut is found to be the best material for sutures. The flaps should be carefully adjusted within the foramen so as to lie snugly and evenly; and, provided they have been cut large enough, two lateral sutures may be inserted through each flap, one on either side of the apical suture. One cause of failure in this part of the operation is want of boldness in cutting large flaps.

Even with these precautions the foramen has an invincible tendency to contract to a minute hole, if it is not held distended, until it is completely healed. Further, it is found that any rod or pin, passed through a web and not firmly held, shifts about and irritates the parts. The result is ulceration below the foreign body, and the formation of granulation tissue above it, so that the rod gradually works down towards the tips of the fingers, and the web re-forms above it. It follows, therefore, that the rod must be held immovably.

Fig. 4.—Side view of the hand with the apparatus and glass rod, C, in place. The rod should be placed more obliquely from before backwards, so as to follow the natural line of the interdigital cleft.

I have devised an apparatus, neither complicated nor costly, to hold the rod in position; and, being made of glass and metal, it can be sterilized. It consists (Fig. 2) of a closely fitting metal wristlet, A, carrying two arms, B and B', which hold the glass rod, C (Fig. 3), in place by means of two screws, D and D'. It will be noted that the metal arm, B, corresponding to the palmar surface, is longer than the other, B'. The glass rod is therefore held obliquely, being inclined backwards and upwards, corresponding to the line of the normal interdigital cleft The diameter of the glass rod should be $\frac{1}{4}$ to $\frac{1}{3}$ in., according to the distance between the bases of the first phalanges. The wristlet and rod are now fixed in position (Fig. 4), and the parts are dressed. If the operation has been aseptic, very few subsequent dressings are required. The stitches, however, are removed on the sixth day, and the rod is replaced for another week or ten days. The fistula will then be found dry, lined with skin, and it is in the situation in which it was made and has not shifted. As an additional precaution, from the first, the hand and forearm are secured to two malleable iron splints, one on the dorsal and one on the front surface, and in the case of children it is advisable to bind the limb to the trunk.

When the surgeon has satisfied himself that the first part of the operation is a success, and not till then, he proceeds to the second part, as in Didot's method (Fig. 5).

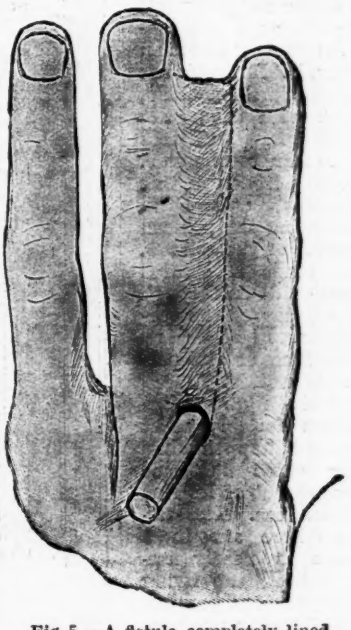


Fig. 5.—A fistula completely lined with epithelium, having been established at the base of the web; this is severed by rectangular flaps as in Didot's operation. The dotted line represents the outline of the dorsal flap; the palmar flap is cut with its base in the opposite direction.

An incision, nearly the length of the web, is made along the palmar surface of one finger from near its tip and terminating above just at the side of the fistulous opening; whilst below a short transverse cut is made, so that when the skin is dissected up a flap is formed. On the dorsum of the other finger a similar proceeding is carried out, except that the flap is in the opposite direction. The remaining tissues of the web are then divided, and the dorsal flap of one finger covers the palmar surface of the other and vice versa.

There are certain points to be observed in this procedure. These are: (*a*) the fingers are not of the same size, and the

flaps should be cut accordingly; (*b*) the flaps must not be cut too broad, otherwise raw surfaces will be left on the fingers; (*c*) the sutures must be most accurately adjusted at the base of the cleft, so as to leave no granulating surfaces. A widely opened foramen in this situation provides sufficient epithelium to prevent this, and the utmost care should be taken at this stage of the operation.

If it is found that the skin flaps are not sufficient to cover the raw surfaces without tension, the former may be undermined with a tenotomy knife, and in extreme cases I have had to resort to grafts taken from the thigh and sewn into position. There should, in any case, be no tension of the flaps, and no raw surfaces left to granulate.

Now, the point of this operation is to secure healing as quickly as possible. In order to avoid irritation, gauze should not be immediately applied to them, but strips of sterilized tinfoil placed on them or wrapped round very carefully. Then plain gauze is carefully applied in strips to each finger, after the glass rod has been again placed at the base of the cleft and fixed in position by the wristlet.

The hand is then bound up and the limb from the elbow downwards put into splints with the arm fixed to the side. The dressings are not removed for three weeks, and it will then be found that the raw surfaces have become entirely covered with epithelium, and the result is satisfactory. If there is any tendency to lateral deviation of the fingers, it can be met by applying a small malleable iron splint to each finger, and in any case massage and daily movement are required.

Where more than two fingers are involved, as in the complicated case shown in the figures, I advise that the separation of two fingers be completed before the others are touched.

### DISCUSSION.

Mr. E. M. Corner (London) complimented the reader of the paper on having achieved a method of operation that would give satisfactory results in these very difficult cases.

## SOME PRINCIPLES IN THE TREATMENT OF LATERAL CURVATURE OF THE SPINE BY EXERCISE.

By J. S. Kellett Smith, F.R.C.S.Eng.

The time available for the reading of any one paper is so brief that it is necessary to avoid argument and to lay down broad principles without having too much regard to exceptional cases.

The human spine is maintained in the erect position by the constant balancing action of certain muscle groups disposed in a direction more or less parallel to its own. It is capable of considerable lateral excursion, the extent of which may be shown in the living subject, or, better still, in such a preparation as was once made by Pirogoff to illustrate this particular question (Fig. 1). Pirogoff took a quite recent body, and, with the pelvis firmly fixed, allowed it to lean to one side. It was frozen in this position, and then, following the natural curves of the column, he made a coronal section down through the bodies of the vertebrae. Fig. 1 depicts the face of the posterior section.

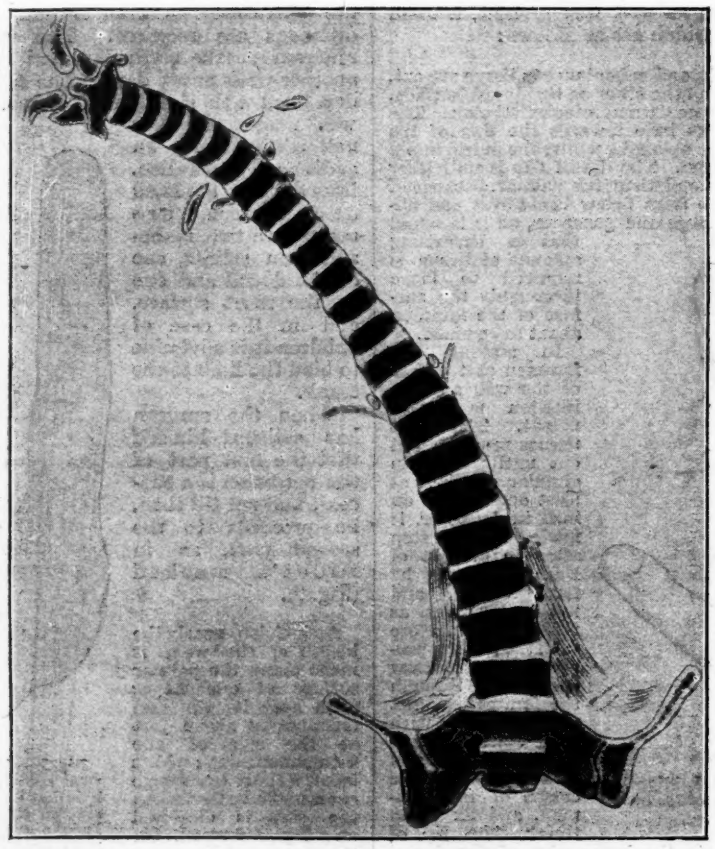


Fig. 1.—Pirogoff's specimen, showing extent of lateral movement of spine.

This figure illustrates forcibly what tends to happen when the spine is once moved out of its line of balance. The tissues here are in a state as nearly approaching the living state as it is possible to get them; the ligaments and intervertebral discs are still fresh; the one thing withdrawn is the power of the muscles, thus showing in unmistakable manner how all-important the muscles are in maintaining the spinal equilibrium.

Incidentally it also demonstrates the fact that the principal seat of lateral movement lies in the three last lumbar vertebrae. Hence the severe curvatures which sometimes result from a cause acting primarily upon this region.

The usual case of lateral curvature implies muscular inefficiency, which may proceed from—

1. Inherent weakness as part of the condition of general constitutional asthenia.
2. Weakness following illness or the drain of rapid growth.
3. Overstrain caused by faulty position in standing, sitting, or following some occupation, and due to some physical defect (pelvic deformity, unequal standing height of the legs, wry-neck, errors of vision, etc.) or to the nature of the occupation (forward sloping writing, piano and violin playing, carrying burdens on one side, etc.).
4. Overstrain consequent upon deficient "muscle sense" prolonging a faulty attitude which would be quite temporary and harmless in the normal child.

The value of exercises in treating and in correcting the results of these various conditions assumes an importance which is even now not fully acknowledged. Without claiming too much or too little their sphere may be stated thus—curative in the majority of the milder cases, an indispensable adjunct in those requiring mechanical correction and support.

The number of exercises recommended for use is large enough to be embarrassing, for the simple reason that the spinal groups of muscles are brought into action in the vast majority of the movements of the body. A study of the anatomy of the deformity in the dorsal region is of great value in selecting the most efficacious.

The sternum is firmly anchored at its upper part by the stout first and second ribs and by the clavicles, whilst any lateral force below this is exerted through the more flexible ribs and their cartilages. In consequence the displacement of the sternum is remarkably small, even in the most advanced cases. The brunt of the thrust and torsion created by the lateral displacement and rotation of the

spine falls upon the longer ribs, and the deformity in shape arising therefrom (Fig. 2) results in fixing the curvature long before any wedge-shaped alteration of the vertebral bodies is developed. In other words, the spine, which in the earlier stages is "whippy" enough to present no trouble in itself, is prevented from going back to mid-line by the deformity of the ribs.

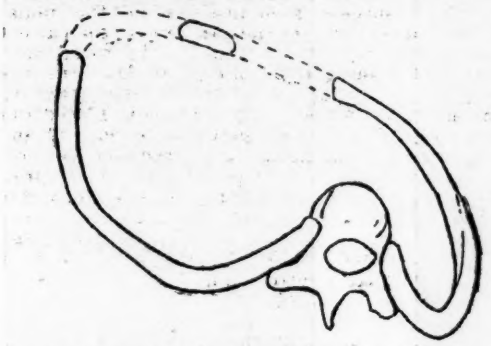


Fig. 2.—Horizontal scheme of advanced scoliosis.

The object of exercises is therefore twofold:

1. To overcome this fixity, to restore the correct form of the ribs as far as possible, and to render the thoracic skeleton so mobile as to be capable of being completely or partially restored to its normal position.

2. To strengthen up the spinal muscles to such a degree that they are capable of maintaining this improved position.

The first object is best gained by carrying out a series of movements in the "all-fours" attitude, in which the spine is relieved of superincumbent weight whilst the liberty of the subject is preserved. Also in this attitude the spine is automatically straightened out, both lateral and antero-posterior curves being affected.

Fig. 3 shows a record of the spine of an overgrown youth 17 years of age, whose trouble is due to a left leg ¾ in. shorter than the right and to close desk work for a year. On the left is the chart of his spine in the erect position, the vertical measurements being taken by calipers from a base line drawn through the posterior superior iliac spines. On the right is a tracing obtained from him on all-fours by placing a dot of printer's ink on the tip of each spinous process and taking a transfer on a strip of linen. The spine is shown to be straightened out, and the production of his triple curve from a single left convex curve is analysed.

The "all-fours" attitude, therefore, fulfils the great essential that all exercises shall be taken in the best possible position. Exercise in a faulty posture is capable of creating a curve, and still more of confirming a curve already present. This is illustrated in the case of a famous fighting man, who adopts a crouching attitude in which the spine is held convex to the left. This curve has now become fixed with him, despite his magnificent muscular development.

Exercises in the "all-fours" position are based upon a principle which may be illustrated by means of a model constructed of flexible metal gas-tubing to represent the spine, and copper wire to represent the pelvic and shoulder girdles (Fig. 4).

If the patient move along in imitation of the usual method of progression in quadrupeds—namely, by moving the limbs in diagonal sequence—a simple curve of the spine

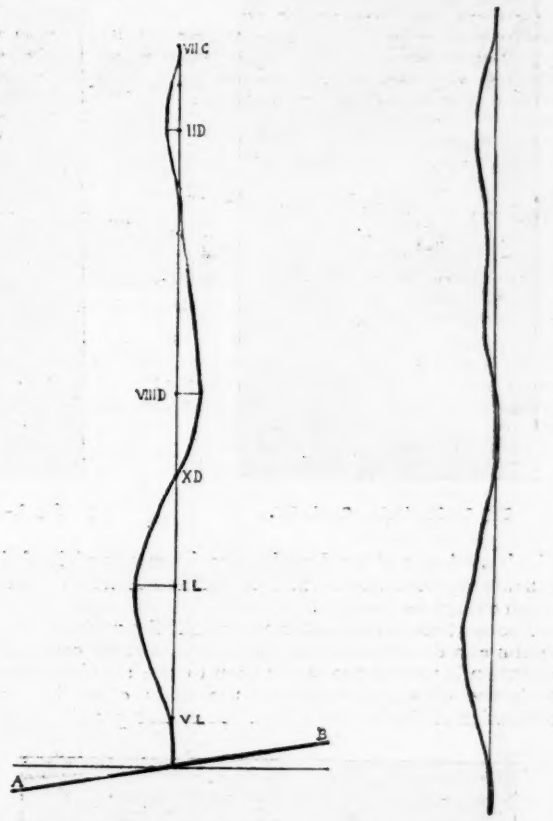


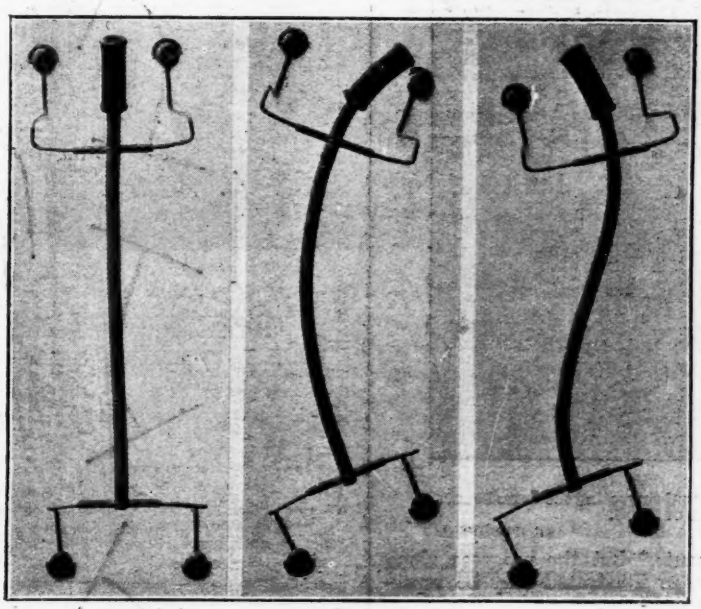

Fig. 3.—Spine in erect position on left, with the subject on all-fours on right.

is produced (Fig. 4, B), which will unfold a deformity of opposite convexity. Moreover, by increasing and decreasing the relative obliquity of the pelvic and shoulder girdles the chief effort may be thrown into the lumbar or dorsal region at will.

If, on the other hand, the patient imitates the pacing action of quadrupeds in which limbs of the same side are moved forwards together (Fig. 4, C), then a double curve of the spine is produced which will tend to neutralize a double curve in the opposite direction.

This effect upon the spine of obliquity of the pelvic and shoulder girdles may also be well shown in various attitudes of standing, sitting, etc.

The actual exercises are three in number, and must always be associated with the names of Professor Klapp and Dr. Fränkel. Figs. 5, 6, 8, and 9 are from the originals in Klapp's book.



A B C

Fig. 4.—Model to illustrate the creeping movements.

Exercise I is the most useful of the series and is founded upon the principle of Fig. 4, B. The patient (Fig. 5) goes

down on hands and knees and makes the first step forwards in such a manner as to unfold the dorsal curve (Fig 6).

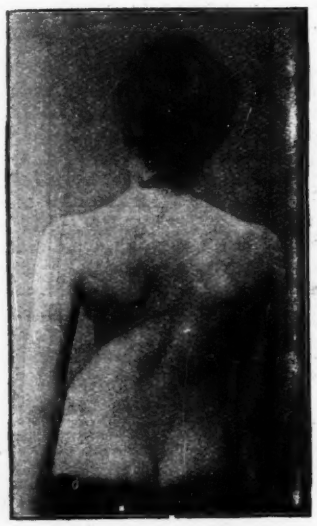


Fig. 5.—Scoliosis. Grade III.

The importance of the dorsal curve, by reason of its fixity, has already been shown and this effort is made with as much energy as possible.

The next step is a quieter one, and if the patient be the victim of a double curve, as in this particular case, more attention is paid to the pelvic than to the shoulder girdle, with the object of throwing the main effort into the correction of the lumbar curve. It is not possible to deal

Fig. 6.—High creeping movement correcting the dorsal curve in the case of Fig. 5.

here with details of movements,* but the progress along the exercise floor of the case illustrated may be represented diagrammatically as in Fig. 7.

Exercise II may be regarded as a variant of No. I, but places more strain upon the spinal muscles. It is founded upon the same principle, however, and is illustrated by Figs. 8 and 9.

Exercise III is made with the pacing step (Fig. 4, c), and is employed in cases of double curvature. Limbs of the same side go forwards together, and the movement correcting the deformity is made with great energy. It is

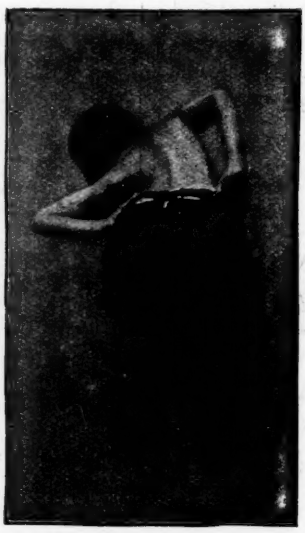


Fig. 8.—Movement to the left in Exercise II.

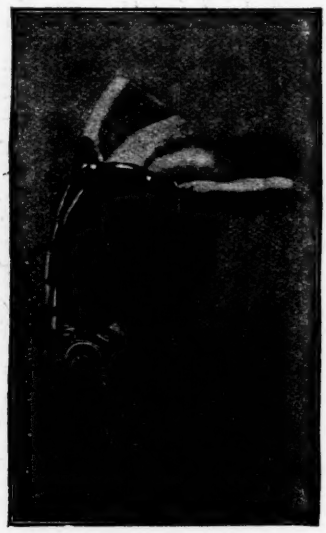


Fig. 9.—Movement to the right in Exercise II.

in reality a forcible stretching movement, and the corrective position is maintained for several seconds (Fig. 10).

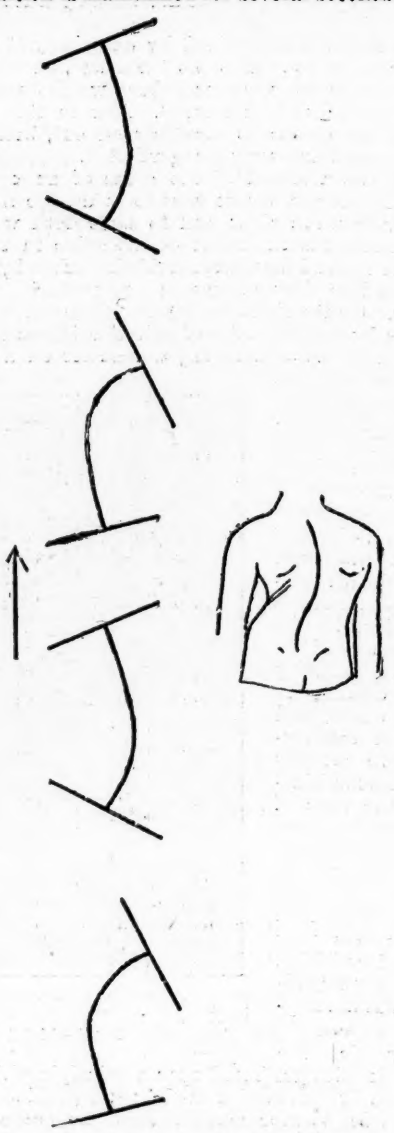


Fig. 7.—Diagram of movements in Exercise I.

* For these consult author's book on the subject.

The next step is a simple one, and merely brings the body into position for a repetition of its more important fellow. From the low position assumed by the fore part of the trunk, this exercise is especially useful when the double curvature is accompanied by dorsal kyphosis.

Fig. 10.—The low creeping movement employed chiefly in double curves with marked kyphosis.

These exercises must be regarded as powerful agents, and demand skilled supervision. [Tracings were shown from an unpromising case—a much deformed adult of 26 years, who had a progressive downwards history of ten years when treated with a mechanical support alone. The tracings were of the "sky-line" of the back at the level of the sixth dorsal spine, and were taken with a wax strip with the patient in the usual position—that is, bending forwards with the trunk at right angles to the legs, and with the arms hanging loosely down. They were taken between points on either side of the spine which occupy the same horizontal plane, and therefore give a true picture of the contour of the posterior part of the thorax.]

As the spine grows more capable of occupying the mid-line the second series of exercises, designed to hold the advantage thus won, becomes more important. They are carried out in four positions—standing, sitting, prone on the floor, or on a bench—but they all have the same root idea, namely, the spine being stiffly held; the trunk is either made to perform movements of flexion and extension at the hip-joints whilst the arms are kept still, or is held in the position of strain (that is, flexed on the hips when sitting or standing, extended if prone) whilst the arms are active.

In all the exercises the spine must be stiffly held, so that the lumbar curve becomes as pronounced as possible, and the erector spinae muscles feel hard to the touch all the time the patient is working. Whatever position is taken up the programme is just the same as regards details of movements, which may be listed as follows (the terms *flexion* and *extension*, as applied to the trunk, meaning always its position in relation to the thighs):

| | Trunk. | Arms. |
|---|---|---|
| I. | Flexion and extension. | By sides. |
| II. | Flexed, if standing or sitting.<br>Extended, if prone. | Fists to shoulders.<br>Shoot fists forwards.<br>Recover. |
| III. | Flexion and extension. | Hands to back of ears. |
| IV. | Flexed, if standing or sitting.<br>Extended, if prone. | Fists to shoulders.<br>Shoot fists outwards.<br>Recover. |
| V. | Flexion and extension. | Stretched above head. |
| VI. | Flexed, if standing or sitting.<br>Extended, if prone. | Swimming movements (breast stroke). |

Fig. 11.—The starting position of Exercise No. I on the bench.

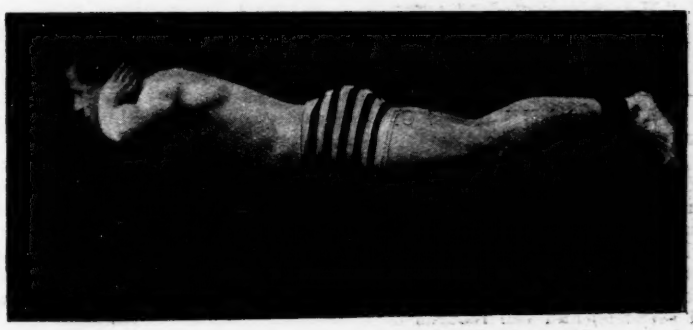


Fig. 12.—The starting position of Exercise No. III on the bench.

These movements belong to no particular system; they are common to most, and are selected for their simplicity and because they concern the inefficient muscle groups in very direct manner. This is important, because the erector spinae muscles, although they may be large in mass, are often found to be singularly feeble in function when subjected to any sustained call. Figs. 11 and 12 give an idea of how these "straight-work" movements are carried out.

Two precautions are very necessary. First, the patient must do all the work with a level pelvis. For example, with a short leg a block of suitable thickness must sometimes be placed under the foot in a standing position, whilst in the prone position it must be remembered that if the ankles are made to touch when the extremities are unequal the pelvis will probably be side-tilted and the spine thrown into curve. Secondly, muscle fatigue must be carefully watched for. As a rule, the erector on the convex side of the abnormal curve is the weaker, so that fatigue is indicated by some "wobbling" of the spine and a tendency for it to drift into deformity. Exercise must be stopped at once and a short rest given.

To these two series of exercises a deep-breathing exercise should be added in all cases for general reasons and for the promotion of thoracic symmetry and mobility. It is best performed with the patient lying on the back. During inspiration the arms are raised from the sides through a vertical semicircle until they come to ground stretched above the head. During expiration they are swept along the floor to the sides again, whilst the patient counts slowly or sings the scale. Moreover, if the movement is made with the arm on the concave side of the abnormal curve alone (the arm on the convex side thereof being kept to the side), then the forcible raising of the ribs on the concave side of the deformity tends to undo the scoliotic rotation of the spine by pressing the rib tubercles against the tips of the transverse processes of the vertebrae.

From the foregoing considerations it is possible to outline a scheme of treatment applicable to the ordinary case of lateral spinal curvature. It should be understood that the deformity may end in disaster if neglected; therefore, for a beginning period, varying with the case, the patient's life must be devoted to one thing alone—namely, to getting the spine straight. The programme of cure may be epitomized under several heads:

1. Exercises for one hour night and morning, the proportion of flexing and straight work to be strictly supervised. During the entire period of treatment a good half of the time is given to the flexing exercises. No. 1 occupies most of the time, Nos. 2 and 3 are introduced for an occasional few minutes. Since they are performed at the rate

of about six double movements to the minute it follows that the patient unfolds the abnormal curves some four hundred times each day. Deep breathing exercise to be carried out at each session, also upon waking and retiring.

2. All attention to be given to the abnormal region. General exercises *not* to be taken, but the daily walks and attendances at meals to be used as drills in training the patient to a sense of upright carriage.

3. Writing and reading at a desk, piano and violin playing, and all occupations involving strain and encouraging faulty attitudes, to be forbidden.

4. The spine must be relieved of weight as much as possible. Therefore bed must play an important part in the patient's life; ten to twelve hours are not too much. Any "brain fag" is to be avoided, but easy studies can be carried out in a good resting position.*

# Memoranda:

## MEDICAL, SURGICAL, OBSTETRICAL.

### SPONTANEOUS EXPULSION OF FIBROID POLYPUS DURING LABOUR.

TEN days ago, in response to an urgent call for help from a local midwife, I attended a woman in her eighth confinement—her first abnormal one. She had been ten hours in labour. The midwife said she could not make out the presentation—"the child seemed strangely locked." On proceeding to examine, and just as I approached the patient, a large fibroid polypus was forcibly expelled through the vulva and precipitated over the edge of the bed on to the floor. Pyriform in shape, it measured 5½ by 4 by 2½ in. It bore no pedicle, but a breach in the capsule ¾ in. in diameter showed where a narrow one had had attachment. There was practically no haemorrhage either before or after the discharge of the tumour. On examination the os uteri was found fully dilated, and the fetal head bearing on the perineum. Delivery was completed naturally within a few minutes. The umbilical cord encircled the neck twice. The child was stillborn. The mother said she had felt no movement for a week; otherwise, she declared, she knew of nothing unusual either before or during her pregnancy. She has made a good recovery.

As I have not seen nor heard of a similar case during thirty years' practice, I think it worth recording.

Abertillery, Mon. C. GORDON BENNETT, M.D.

### OSCILLATION OF THE VEINS AT THE ROOT OF THE NECK AS A SIGN OF AURICULAR FIBRILLATION.

THE splendid work of Mackenzie and others on auricular fibrillation has excited the interest of the profession to the highest degree, and its presence in certain cardiac affections must be eagerly sought for by all. In an article in the BRITISH MEDICAL JOURNAL Dr. Mackenzie gives as signs of its presence the disappearance of the presystolic murmur (in cases of mitral stenosis) and the records of the polysphygmograph and electrocardiograph. It appears to me that in some cases its presence may be actually seen by a study of the pulsation of the veins of the root of the neck. The following case illustrates this point:

Mrs. E., aged 70, subject of mitral regurgitation of long standing. Both ventricles dilated; the apex beat 1½ in. outside nipple line, and area of cardiac dullness extending 2 in. to the right of the left border of the sternum. The patient has shown moderate cyanosis for some years, but has been able for the most part to live a quiet life in comparative ease. Latterly she has had short attacks of palpitations with alarming cyanosis, dyspnoea, and distress. When these attacks pass off she is able to lie in bed in comfort. The ventricular systole (and radial pulse which is of good volume) is, except during one of these attacks, regular and about 80 to the minute. On watching the root of the neck the veins are seen in rapid, uncountable, irregular oscillation, in striking contrast to the regular ventricular beat of 80. Venesection to the amount of 8 oz. relieved the patient considerably, and she has since (a fortnight ago) suffered no more from the attacks of palpitation and cyanosis, and the area of cardiac dullness has to some extent decreased; it has, however, had little or no effect on the oscillation in the veins of the neck.

It is certain that this oscillation is not due to the impulse caused by the backward wave of blood driven directly through a largely incompetent right auriculo-ventricular orifice into the great systemic veins, because then the oscillation would be at the same rate as the ventricular systole. The movement in the veins, can in my opinion be only explained by transmission of the rapid irregular oscillations caused by fibrillation of the right auricle.

Lewes. JOHN R. STEINHAEUSER, M.D.Lond.

### A CASE OF ACUTE FORMALIN POISONING.

THE interesting account of a case of acute formalin poisoning reported in the JOURNAL for August 17th by Dr. Watt leads me to put on record the following brief account of a somewhat similar case that came under my notice some years ago.

A strongly built man, aged 30, was admitted to hospital suffering from acute perforative appendicitis. An operation was performed immediately and a gangrenous appendix was found along with diffuse suppurative peritonitis. Improvement after the operation was rapid, and in a week the temperature had almost reached normal, though there was a profuse local discharge of pus. When in this condition one evening the nurse in charge, after placing a thermometer under the patient's arm, left the ward for a few minutes, and on her return found the patient unconscious. Another patient in the ward then informed her that the moment she had left the ward the patient in question had got up, and had walked a few yards to a neighbouring press from which he had taken a bottle and drunk the contents. The empty bottle was found in the patient's bed, and proved to be one known to have contained about 3 oz. of 4 per cent. formaldehyde. I was telephoned for immediately, and on arrival about five minutes later found the patient quite unconscious; his face was strongly flushed, the breathing stertorous, and the pulse 96 to the minute, but steady and rather full. There was no discoloration of the lips or mouth, but there was a strong odour of formalin from the breath. The pupils were dilated, the conjunctival reflex present, and the conjunctivae deeply injected. The skin over the chest and abdomen was pale and moist. I immediately passed a stomach tube and washed out the stomach with strong saline solution and later with liquor ammonii acetatis. The first washings smelt most strongly of formalin, in fact overpoweringly so, and contained much altered blood. I continued the washing until no smell of formalin could be detected from the water as it siphoned back from the stomach. Before this stage was reached, however, the patient recovered consciousness; in fact, he began to revive as soon as the first large quantity of formalin had been evacuated, and was able very soon to explain in a dazed manner that he had been trying to get a drink of whisky. He slept well that night and next day seemed almost completely recovered, except for some slight pain in the throat. No abdominal pain whatsoever was complained of, and in a few days he was anxious to get food, though difficulty in swallowing, owing to the soreness of the throat, was complained of. The first motions after the incident were tarry and contained a little mucus, but later, though fluid, were free of blood.

The subsequent history was unfortunate; burrowing abscesses formed in the neighbourhood of the appendix wound, general septicaemia ensued, and death took place five weeks after admission.

At the *post-mortem* examination patches of fat necrosis were found in the abdomen; the interior of the oesophagus and stomach was extremely corroded, the most marked corrosion being found close to the pylorus. No signs of irritation were found in the duodenum or elsewhere in the alimentary canal. Apart from the changes commonly found in the organs in fatal cases of septicaemia, nothing else abnormal was detected.

The points that impressed me most in the case were: (1) The rapidity of the onset of unconsciousness, probably not more than three minutes elapsing from the time the formalin was taken until complete unconsciousness was present; (2) the rapid recovery of consciousness as soon as the formalin was removed from the stomach; (3) the complete absence of abdominal pain during the subsequent course of the case in spite of the extreme corrosion of the gastric mucosa; (4) the absence of all signs of inflammatory reaction in the stomach, the appearance of which resembled that seen in cases of acute fatal carbolic acid poisoning.

Dublin. T. GILLMAN MOORHEAD, M.D., F.R.C.P.I.

* This paper was illustrated by many more pictures than it has been possible to reproduce.

# Reports of Societies.

## MEDICAL SOCIETY OF LONDON.

*Monday, November 11th, 1912.*

Sir William Watson Cheyne, Bart., President, in the Chair.

### *Respiratory Neuroses.*

Dr. Samuel West, in opening a discussion on the respiratory neuroses, divided them into two groups, according as they are associated with defective aëration of the blood or not. In the first group were asthma, laryngismus stridulus and the other laryngeal spasm, and whooping-cough; in the second, paroxysmal tachypnoea, the air-hunger of diabetes mellitus and allied conditions in uraemia, periodic respiration—either Cheyne-Stokes in type or grouped. He regarded asthma as a central respiratory neurosis, and emphasized its resemblances to epilepsy. It might alternate with epilepsy or insanity. Laryngismus stridulus was closely related to convulsions; another form of laryngismus was that due to hysteria. Whooping-cough, too, was associated with a neurosis central in origin, due to an infection associated with a specific catarrh. Paroxysmal tachypnoea, wrongly called "hysterical asthma," constituted a peculiar clinical group like paroxysmal tachycardia. It was a rare condition. The air-hunger of diabetes was probably due to a chemical poison. It developed abruptly, and a condition that was sometimes seen in uraemia resembled it. He contrasted Cheyne-Stokes breathing and grouped respiration. The latter was rare, occurring generally in the coma stage of meningitis in children. Cheyne-Stokes breathing as a pathological phenomenon occurred under various conditions, which might be referred to two clinical groups, according as it was associated with (*a*) some disease or morbid state of the central nervous system in which the prognostic import was that of the disease in which it occurred; (*b*) a failing heart. In these cases it was of very grave significance. Study of all these respiratory neuroses led to the same conclusion—namely, that they were the result of some irregular action of respiratory centres higher than those in the medulla. Sir David Ferrier thought that whooping-cough could not be described as a respiratory neurosis, nor could the irregularities of breathing that are sometimes seen in hysteria. He agreed that asthma was a true neurosis, and might occur without any source of peripheral irritation, and that it had close affinities to epilepsy. All the essential symptoms of the attack could be explained by the constriction of the bronchials by irritation of the vagus. It did not appear correct to describe it as a state of *expiratory* dyspnoea, for the *inspiratory* muscles were those which were fully contracted. Cheyne-Stokes breathing occurred under a number of pathological and normal conditions, and could be produced artificially in normal individuals. According to Haldane, Pembrey, and others, it appeared that excess of carbon dioxide caused hyperpnoea, whilst hyper-oxygenation caused apnoea, as in this condition there was no stimulus to the respiratory centre. Normally the respiratory centre maintained a fairly constant level of carbon dioxide pressure in the alveoli and blood; in certain conditions, however, it permitted wider variations, and the respiration became periodic or of Cheyne-Stokes type. He regarded this type of breathing as of grave import. Dr. Hector Mackenzie referred to cases of troublesome and noisy cough in young people, without organic disease, and to tachypnoea, and said that both could be remedied by such treatment as was usually employed in functional neuroses and by faradism. Asthma might cease after a severe illness, which favoured the view that it was a true neurosis. Dr. Leonard Guthrie thought that hypersensitiveness of the sympathetic system was closely related to respiratory embarrassment. He divided respiratory neuroses into somatic and psycho-somatic forms. There was a close relationship between asthma, "dead" fingers, erythema exudativum and urticaria, and between asthma and eczema. Dr. Farquhar Buzzard said that in double hemiplegia it appeared to be necessary to reinforce respiration by the use of voluntary muscles. In a case of laryngismus stridulus, the ganglion cells of the brain and cord had shown signs of hyperactivity. In two cases of Cheyne-Stokes breathing he had found marked changes in the cells of the medulla. The trend of scientific evidence was to inculpate the lower centres in this condition. Dr. F. E. Batten thought that in paroxysmal tachypnoea the respiration was always of the inverted type, the pause coming after inspiration.

## ROYAL SOCIETY OF MEDICINE.

Section of Electro-Therapeutics.

*Friday, November 15th, 1912.*

Dr. Reginald Morton, President, in the Chair.

### *The Dangers of Electricity.*

At this meeting an address, illustrated by the cinematograph, was delivered by Professor Jellinek of Vienna, who said that for many years he had been studying the dangers of electricity in their clinical, forensic, and other aspects. A question often asked was, Is the current dangerous? But the answer to it was often very difficult; in Vienna fatal results had ensued from touching the conductor of a 100-volt current, while there were instances of persons coming into contact with a 10,000 and even a 20,000-volt current without it killing them. To understand this, both (1) external circumstances and (2) individual or personal circumstances must be considered. The former included voltage, ampèrage, number of poles touched, and the time during which the current passed. In the second category were the resistance of the body, its condition, the path taken by the current, and the mental condition of the victim. Remembering the experience in Vienna, he could not agree with those who said that the limit of safety was an alternating current of 300 volts, and a continuous current of 500 volts. Indeed, one man, a mechanician, was killed by a current of only 65 volts, through touching an electric lamp. Electricians stated that one-tenth of an ampère could be borne by a man, but that was not always right. Often the touching of only one pole sufficed to produce an accident, because unsuspected earth conduction existed. In the question of protection from the effects of electric shock the most important rôle was played by the skin, and the resistance exerted by the skin varied with its thickness and its degree of moisture. Regard must also be had to the clothes and boots worn at the time, whether the victim stood on a carpet, and his proximity to such such things as gas-pipes, which were in direct contact with the earth. Accidents from the breaking of telephone wires were fairly frequent, and in one such case the victim's neck was practically cut or burned through. Experiments on horses showed that though most of the charge was conducted via the skin, some traversed the brain also. Electricity, like poisons, affected in different degree various animals and persons; tortoises and frogs were almost immune, while white mice and horses were most susceptible. Experiments on dogs seemed to show that death by alternating current was due to suffocation induced by violent spasms of the diaphragm, and his own general conclusion was that death from electricity was due to suspended animation or brain paralysis. Electro-pathology was very important from a forensic and social standpoint, and the physician was often called upon for an opinion in cases of claims for damages, and as to mode of death in particular instances. Sometimes it was the mode of death in murders and suicides. There was now in the University of Vienna an electro-pathological museum, and the knowledge already gained made it possible to reconstruct many cases of doubt and so determine the degree of culpability. Many deaths were due to short-circuiting. Skiagrams revealed rarefaction of bones produced by electric shock, and various severe lesions of tissues. These latter, fortunately, healed very favourably, and recognition of this fact had saved amputations in a number of cases. In one instance there was such severe damage to the leg that amputation at the knee had been urged, but was not done, and the man recovered. Usually wounds electrically produced were painless and healed without suppuration. This absence of pain was a useful point in connexion with cases of malingering and spurious claims for damages; also the scar resulting from electric discharges was smooth and supple. In regard to the immediate cause of death from electrical current, some said it was due to heart stoppage, others to paralysis of respira-

tion, and others, again, paralysis of the brain. All these views were in different cases probably accurate. The great point was that the cases could be quite hopefully treated by artificial respiration, especially the Schäfer method. If this fact had been generally recognized, many lives could have been saved. Even physicians did not always realize the degree to which life could be preserved after such an accident. The most precious moments were those immediately following the shock. The cinematograph demonstration given was one specially designed for the instruction of electrical workers and labourers; the film had been kindly lent by the Government of Austria.

Dr. H. LEWIS JONES commented on the slight degree to which those who had non-fatal accidents from electricity suffered from various nerve conditions; yet one read of people bringing actions for damage on account of such symptoms after these accidents. Some deaths were due not so much to the actual passage of the discharge through the body as to the severe thermal effects. In one case the muscles and vessels of the implicated limb had been converted into a coagulum by the intense heat generated.

Professor SILVANUS THOMPSON remarked that he had not witnessed a single bad electrical accident. Commonly the men employed at switchboards properly comprehended the dangers of the work. In this country a more or less grandmotherly Government made regulations which, if carried out, would always prevent such accidents as Professor Jellinek had described.

Mr. SCOTT RAM, Electrical Inspector of Factories, said it was frequently stated that the continuous current was more dangerous than the alternating, but he did not consider that was borne out by the facts. During the last ten years he had had to investigate forty-five deaths by electric shocks of 250 volts or less. Yet there were in that time only three from continuous current, though the use of the two kinds of current did not vary much. Sometimes the doctor did not give electrical cases a chance. He had known cases where a medical man had been called, pronounced life extinct and went away; and subsequently the victim's mates decided to "have another go at him," and succeeded in saving his life. In another case the doctor simply ordered the removal of the victim to a cottage hospital a mile away.

The PRESIDENT (Dr. Reginald Morton) expressed high appreciation of the lecture and the kindness of Professor Jellinek in coming such a long distance to deliver it. He commented on the need of a wide dissemination of such facts as had been brought out on this occasion, especially in regard to the immediate application of first aid. This was the more important, in that there was a tendency to neglect acquiring a knowledge of the proper thing to do, owing to the fact that a medical man might go through the whole of his professional career without being called to a case of supposed death from electric shock.

Professor JELLINEK replied.

## ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF MEDICINE.

*Friday, November 1st, 1912.*

Dr. J. O'CARROLL, President, in the Chair.

*"Vitalism."*

DR. O'CARROLL, in a presidential address, held that a physico-chemical explanation of life was quite unhelpful to the physician; however possible the *de novo* origin of life from unorganized matter might be, it was nevertheless impossible to predicate that only the same forces, physical or chemical, operated in a living as in a dead thing. In life new force or forces came into existence, for which no convenient name other than "vital" force had been devised. That force showed its existence in many ways, but chiefly in its capacity of resistance to extinction. Vital resistance begot an adaptability to circumstances, a division of function among the parts of a compound organism for better maintenance and defence of the whole individual, and finally a power of compromise between contending or hostile organisms of similar or different kinds. That division of labour and power of compromise implied a certain social order which seemed an embryonic form of social ethics. Unless the terms "chemistry" and "physics" were to be extended quite beyond any accurate meaning they could not include ethics among their connotations. If they did they would have as little value as Professor Schäfer ascribed to "vitalism." In the practice of medicine the "vital" conception of disease was all-important. It taught the physician to separate symptoms which were essentially morbid from those which indicated resistive or protective processes, and thus led to the adoption of treatment which would help and not obstruct the vital processes which made for survival of the individual.

## LIVERPOOL MEDICAL INSTITUTION.

*Thursday, November 7th, 1912.*

Mr. ROBERT JONES, President, in the Chair.

*Tuberculin Treatment.*

DR. CLAUDE RUNDLE, in a paper on considerations of temperature in selection of cases for treatment by tuberculin, said that in cases in which temperature had been normal for a week or more, and he had begun the administration with a dose of 0.00005 mg. and increased it rapidly, the result was satisfactory. In a case with an evening rise of temperature to 99° F. or 101° F. many authorities discouraged the use of tuberculin, but in such cases the most brilliant empirical results had been obtained. When there was a superadded streptococcal infection, he found an autogenous vaccine valuable, and after the secondary infection had been overcome, tuberculin was of use when the temperature ceased to oscillate. In cases in which the temperature usually varied between 101° F. and 102° F., and never dropped to normal, the results of tuberculin were unfavourable.

Dr. NATHAN RAW, in a paper based on 640 cases treated by tuberculin, said that the impression left on him was that in a great many cases permanent good was done, but where acute disease was complicated by a superadded infection little could be expected. In all cases general in addition to tuberculin treatment was desirable. It was difficult to decide in advance what cases would improve under the treatment. The author used Koch's new tuberculin, human and bovine, and he preferred a mild dosage. A temperature of 101° F. or more was a contraindication, as also was haemoptysis, owing to the local hyperaemia produced. In virulent infections tuberculin was of little use. Some of the best results were obtained in gland infections, and despite the fact that the infecting organism was often bovine, human tuberculin gave the best result. It was most important not to give tuberculin in any case in which there was pent-up pus or caseating material; all such deposits should be evacuated first, otherwise the treatment would cause local reaction and a general diffusion of the disease. As little as possible should be done with the knife beyond incision of the part to liberate the pus. His initial dose was one ten-thousandth part of a milligram. In making a diagnosis he used Moro's ointment for children and von Pirquet's test. They were useful, but in acute illness a positive reaction would not prove that the condition was due to tuberculosis. An old quiescent deposit would give the same reaction. It was not to be assumed that in an apparently cured patient a permanent immunity had been secured.

Dr. T. R. BRADSHAW said he had watched Sir A. Wright's early work with great interest, and had seen very striking results, but his further experience had not been so favourable; in many cases there was only improvement at the beginning. A reaction to von Pirquet's test was not an indubitable proof of tuberculous infection.

Sir JAMES BARR said he had found that many cases did very well with tuberculin treatment, but young subjects with bad digestions and rapid pulses did not improve at all.

Dr. CRACE-CALVERT used bacillary emulsion, and had not seen severe reactions. His dosage was one hundred-thousandth part of a gram, increased gradually. Tuberculin was not going to revolutionize the treatment of tubercle, and statements such as "with tuberculin victory over the disease was never in doubt," which he had seen in one publication intended for popular reading, were most undesirable.

Dr. R. J. M. BUCHANAN thought it would be a great advantage if some definite standardization of tuberculin

could be reached so as to allow real comparison of results obtained by various workers. In mixed infections tuberculin did little good.

Professor Ernest Glynn did not think glandular tuberculosis was so often due to bovine infection as did Dr. Raw, and he could not believe there was any advantage in treating bovine tuberculosis by human tuberculin or vice versa. The ideal would be to treat a subject of tuberculosis by tuberculin from his own bacilli.

In his reply Dr. Rundle said that he was aware that the public health service of the United States had reported unfavourably on the use of tuberculin, and that in France its use was much decried.

Dr. Raw, also replying, quoted experiments in cattle which proved that they could be immunized by human but not by bovine tuberculin.

## UNITED SERVICES MEDICAL SOCIETY.

At a meeting on November 13th, Fleet Surgeon Bassett-Smith in the chair, Colonel Bruce Skinner showed that the mobility of an army was influenced by (1) the amount of transport requisite, (2) the amount of food procurable, (3) the amount of sickness amongst the troops, (4) the necessity of protecting both supplies and also medical units occupied by the helpless. Hence an army doctor must study war, in order readily to grasp the designs of the field commander and exercise a trained imagination in foreseeing and providing for any military situations that might arise. A field medical unit must never become clogged with sick and wounded, and such a condition could only be avoided by free evacuation towards the base. The fewer the sick and wounded retained at the front the more the supplies there were available for the healthy, and the nearer the base the hospital was situated the shorter the distance over which the supplies of equipment, personnel, appliances, and food for hospital use had to be transported, and the greater the technical efficiency of such units. The true hospitals, then, must be on the lines of communication, and the advanced medical units should consist mainly of ambulance transport. His final conclusions were as follows: (1) A force without sufficient medical transport loses mobility and requires additional Army Service Corps transport. (2) A force with adequate medical transport gains in mobility and needs less Army Service Corps transport. (3) The necessary evacuating transport must take the form of a medical unit, such as the "ambulance column" now proposed for the Indian army, because in the stress of war they could not rely on any other branch of the army to supply their needs, nor upon any improvised transport. The sphere of operations for this unit was between the field ambulances and the line of communication, working under the Deputy Director of Medical Services of the latter. (4) The organization of such a system of evacuation formed the crux of the medical problem in war.

## SOCIETY OF MEDICAL OFFICERS OF HEALTH.

At a meeting on November 8th, Dr. E. W. Hope, President, in the chair, Dr. H. Scurfield read a paper on the *Need for infant management* being given a more important place in the medical curriculum. He said that the subject was so important that even in the admittedly crowded state of the curriculum a place should be found for it. It was supposed to be included in a course of midwifery, but was referred to only sparsely. As the result of infant consultations and the writings of those who had given special attention to the subject, it was at last being realized that such matters as the management of breast-feeding could not be left to the instinct of mothers aided by the advice of ignorant grandmothers. It was ludicrous to insist on the rights of the unborn child if after birth it might be gradually and insidiously done to death by some process of artificial feeding, undertaken perhaps quite unnecessarily, owing to a carelessly managed cracked nipple. It was frequently reported that excessive infant mortality-rates were due to the ignorance of the mothers, but the fact was there was nobody to teach the mothers, for doctors were not taught nor were midwives. If each medical practitioner began his career with a good substratum of knowledge of the subject, and if such knowledge were also imparted to each midwife in the course of her training, results would soon follow in the reduction of infant mortality. Dr. R. Dudfield said that the Metropolitan Branch of the society had prepared a standard scheme for child rearing. He also referred to the great good which was accruing from the formation of infant consultations. Dr. John Meredith thought there might be some standard method adopted, and referred to the practice prevailing in Somerset of breaking the nipple strings of babies by the nurses. Injuries to the breasts often followed, which in after-life might militate against the usefulness of the gland. Dr. Bostock Hill thought some good might be done by bringing the matter before the General Medical Council, although in the present overcrowded state of the curriculum it was difficult to decide which chair should deal with the subject. Mr. F. E. Fremantle said that at the Watford training school for midwives a mothercraft club had been started, at which the nurses could get practical knowledge of feeding results. He thought it would be better not to suggest another subject, but some method by which the whole curriculum could be permeated with the question. Dr. A. M. N. Pringle, while agreeing that there was a lack of knowledge among both medical men and midwives as to the management of infants, considered that it was of importance to give instruction in the management of the pregnant mother. Dr. H. Beale Collins stated as his experience that midwives recommended mothers to nurse their children, and doctors did not. Dr. A. H. Bygott said that the difficulty in teaching infant dietetics was that there were no beds in hospitals allotted to infants.

## HUNTERIAN SOCIETY.

At a meeting on October 23rd, Mr. A. H. Tubby, in a presidential address, described the immediate cause of surgical shock as exhaustion of the vasomotor centre in the medulla. Among its chief primary causes was excessive loss of $CO_2$. It had been shown that $CO_2$ was the great stimulant of the respiratory centre, and it was essential to maintain it in proper proportion in the body. Its loss might be neutralized by injection of saline solution saturated with $CO_2$. Mr. E. G. Schlesinger, in a paper on *Intravenous anaesthesia*, said that this method had a very definite but limited application. The indications for giving ether intravenously were severe shock, haemorrhage, cases with complications of any kind, and those in which the patient was very nervous. Mr. H. C. L. Noel, speaking of paraldehyde as an intravenous anaesthetic, said it was best to dilute it so as to form a 10 per cent. solution saline. It was of use both in minor surgical procedure and as a preliminary to intravenous ether. Mr. C. M. Page, speaking of hedonal, said that reported fatalities had been due to overdosage, while the local thrombosis which was sometimes observed was brought about by the temperature of the solution being too high. It was contraindicated in general arterio-sclerosis, cardiac disease, old people, and in cases in which there was liability to post-operative bleeding into mouth or air passages. Cases suitable for its use were cerebral and spinal conditions and extensive cellulitis of the neck. Dr. Silk thought that Mr. Page's summary of the cases suitable or unsuitable for hedonal applied equally to ether. Mr. H. E. G. Boyle considered that the long period of unconsciousness following hedonal anaesthesia was not always a good thing, but both this and ether infusion presented great advantages in large operations about and in the mouth. Mr. Ashley Daly considered that infusion methods should be confined to cases with lung disease and those requiring a saline solution. The method was inadvisable in jaw and mouth and throat cases. It did not offer any great advantage over the inhalation method, except in the two classes mentioned above.

At a clinical meeting at the Westminster Hospital on November 13th the following were among the exhibits:—Mr. W. G. Spencer: (1) A woman who had undergone an operation for *Varicose veins* in both legs. They had been treated by a spinal incision extending round the the thigh and leg and the wounds had healed perfectly. (2) An infant suspended on a gallows as for a fractured thigh; twenty-four hours previously it had undergone operation

for a very large *Inguinal hernia*, and was now contentedly sucking its bottle. The PRESIDENT (Mr. Tubby): (1) A case of *Angeioma* of the lower lip, tongue, tonsils, and fauces. (2) A case of *Cervical rib* in a boy, with weakness of the right arm following an injury. Mr. E. ROCK CARLING: A case of *Jacksonian epilepsy* following a fracture of the skull. Dr. CARLYLL (for Dr. Gossage): A man, aged 74, presenting occlusion of the superior vena cava; it was reported as probably due to a specific thrombosis. Mr. J. M. G. SWAINSON: Two cases of fracture which had been treated by operation; splints had previously been tried. The first case (under Mr. Tubby) was a transverse fracture of both bones of the forearm. The second case (under Mr. Carling) was a fracture of the upper parts of the shafts of the tibia and fibula. Skiagrams showed good union in both cases; slight shortening was present. Dr. PURVES STEWART: (1) A case of cerebral syphilis in a man of 28. (2) A case of disseminated spinal sclerosis in a woman of 46. (3) A case of extracerebellar tumour in a woman aged 28. A demonstration of clinical pathological methods and specimens given by Dr. R. G. HEBB and Dr. J. A. BRAXTON HICKS included a new way of estimating the strength of a vaccine by a standard bacterial emulsion.

## NOTTINGHAM MEDICO-CHIRURGICAL SOCIETY.

AT a meeting on November 6th, Mr. W. G. LAWS, in a presidential address on "Man in the Making," cited instances to show how deep and persistent were the traces of the race history in the structure of the individual, and then proceeded to outline what was known of the more important of the races of prehistoric man, their physical characteristics, and the condition under which they lived, illustrating his remarks by diagrams and specimens of implements of various periods.

## ASSOCIATION OF REGISTERED MEDICAL WOMEN.

AT a meeting on November 5th, Dr. CONSTANCE LONG, President, in the chair, the following resolution was adopted unanimously, and a copy of it directed to be brought to the notice of the Home Secretary:

> That the Association of Registered Medical Women feels strongly that medical training is of the greatest importance in dealing with questions connected with the diagnosis and treatment of the feeble-minded, and ventures to urge that one at least of the women Commissioners under the new Act should be a medical practitioner.

Dr. MAY THORNE gave an account of some of the theories which have been held in the past with regard to secondary growths in carcinoma of the breast, and subsequently reviewed the more recent theories, quoting the work of Stiles, Watson Cheyne, and Cheatle, and giving a full account of the permeation theory of Sampson Handley, who believed that cancer spread almost entirely by way of the lymphatics. Finally, she showed a series of lantern slides lent by Mr. Sampson Handley to illustrate the paper. Miss CHAMBERS, who also showed some microscopic slides, said she thought the lymphatic permeation theory could only be applied to special cases, and that it was rash to assert that cancer was never disseminated in the blood stream. She gave a short account of research work in rats and mice. In these animals the rate of growth varied greatly without definite reason; this could only be explained by assuming the presence of immunity processes; a sudden breaking down of immunity allowed metastases to develop. Miss STONEY gave proof of the efficacy of $x$ rays in destroying cancer cells. The PRESIDENT then reported on the Chancellor's offer to the profession, and gave a lucid account of the present state of affairs with regard to the Insurance Act.

THE third International Congress on Diseases of Occupation will be held at Vienna in the autumn of 1914. The following subjects are proposed for discussion: (1) Fatigue—its physiology, especially in relation to professional work; action of such work on the nervous system; night work. (2) Work in a hot and moist atmosphere. (3) Anthrax in workmen. (4) Pneumonokoniosis. (5) Injurious effects of electricity in certain industries. (6) Industrial poisoning (aniline, mercury, and lead). (7) Injurious effects of industrial work on the hearing.

# Reviews.

## THE LAND THAT IS DESOLATE.

SIR FREDERICK TREVES has added another to the books of travel wherewith he has beguiled the leisure and sometimes excited the envy of many who for lack of enterprise or opportunity do not tempt the pains and pleasures of foreign travel. The new book possesses this moral advantage over some of its predecessors, that it will be less apt to excite the passion of envy in the general. *The Land that is Desolate*[1] is Palestine, and the author gives such an account of its dreariness and ugliness, of the squalor of its towns and villages, of the exploitation of its holy rites, and of the vulgarization which follows in the train of hordes of tourists, that all the glamour seems to have disappeared. The present-day leanness of the land that one time flowed with milk and honey appears to be due to the Turks, the worst foresters in the world, who by their improvident cutting down of trees, which they never replace, seem really to have changed for the worse the climate, not only of Palestine, but of Thrace.

To the traveller who visits Southern Palestine in search of the picturesque, Sir Frederick Treves would say, "Go to Jericho." The road there from Jerusalem is dreary and monotonous, which may account for the sense in which the exclamation is used, but both the new and the old Jerichos are in an oasis of verdure in a barren land. And the Dead Sea, an hour and a half away, Sir Frederick Treves will not admit is appropriately named. It is, he says, when close at hand, a merry sea, for, as the wind ripples it, tiny waves, clear as crystal, break upon a beach of bright pebbles, and it is a kindly sea, for none can drown in its waters, though he found it possible both to dive and to swim under water. The sea, which he would call the Salt Sea, or Sea of the Plain, receives the Jordan, but has no outlet. The eastern wall of the lake is formed by the mountains of Moab, the western by the mountains of Judea. He saw the eastern wall coloured brick-red by the sun, so that the precipice was aglow as if lit by a furnace fire, while the western wall was shrouded in purple shadows, as if the heat were fading out of the stone, and he says:

> It thus comes to pass that the Dead Sea may appear to lie in the hollow of an enormous crucible of red-hot rock where its waters are being evaporated by some unseen fire.

The only building in all Jerusalem which he found beautiful is the Dome of the Rock, the Mohammedan shrine, commonly called the Mosque of Omar, on Mount Moriah, the site of Solomon's temple and the later temple of Herod. In the centre of the dome projects the actual rocky summit of the mount—an irregular mass of bare, natural stone some 5 ft. high, and nearly 60 ft. in its longest diameter. The only ceremony, if it can be so called, which he found impressive was the moaning by the wall, when, every Friday, devout Jews from many countries assemble under a lofty megalithic wall—one of the outer sustaining walls of the temple area—and lament the downfall of their city. Of the degrading superstition displayed by the Christian pilgrims; of the tawdry decorations of the Christian churches on spurious sites; and of the irreverent quarrels and fights of their priestly guardians he has many hard things to say, but none so hard as the passages he quotes from Dean Stanley. Of the insanitation of Jerusalem he gives some lurid hints. The way to the Dome of the Rock is through the cotton merchants' bazaar:

> This is a long, stinking tunnel, with a roof of solid masonry, and, on either side, immense cavernous vaults built also of stone. The cotton merchants have vanished; the place is deserted; while the massive crypts where the cotton was piled are now used for storing manure. As an illustration of Turkish views upon sanitation the place is not uninstructive.

He has little that is good to say of the majority of the religious or semi-religious institutions established by the Christians in Palestine, but he makes an exception for the British Hospital at Nazareth, which, he says, carries out without ostentation a valuable work of pure benevolence.

[1] *The Land that is Desolate: An Account of a Tour in Palestine.* By Sir Frederick Treves, Bart., G.C.V.O., C.B., LL.D. London: Smith Elder and Co. 1912. (Med. 8vo, pp. 295; illustrations 45, map 1. 9s. net.)

Sir Frederick Treves was accompanied by Lady Treves and eventually they found their way to Damascus, and there in the "rose-red city half as old as time" at last found sights to stimulate the imagination and to delight the eye. He found, indeed, the view over the city one of the three or four finest in the world. Of people of many nations who throng the streets of Damascus, of its bazaars and gardens he has much to say that is pleasant to read, and he has this good word for one British institution, the hospital of the Edinburgh Medical Mission:

> It is situated beyond the walls, in a pleasant suburb. . . . Here, in a garden full of flowers, is a hospital, which, without any regard to nationality or creed, has carried out for long a most admirable and benevolent work under the direction of Dr. McKinnon, who has been resident in Damascus for over twenty years.

The *Land that is Desolate*, in spite of its title, is a holiday book written in the holiday vein, which is well sustained in spite of many discomforts due to bad weather, unmade roads, filthy towns, and cosmopolitan hotels. Sir Frederick Treves carries the reader through it all in good temper and good spirits, and here and there lightens the way by phrases which are always apt and often striking, as when he says of the narrow streets of Jaffa (Joppa) that "they ramble and intertwine like the branches of a bramble bush," or of a caravan that the strings of camels and men walk in single file, "the camels with so supercilious a stride and the men with so weary a bearing that the camels seem to be driving the men into captivity."

The pictures in the book, all reproductions of photographs by the author, really illustrate the text. They are all good, but the best is the frontispiece showing the Dome of the Rock. Though only in black and white—and much of the beauty of the building must reside in its colouring—it goes far to justify the superlatives of the text.

## MONOGRAPHS ON BIOCHEMISTRY.

To the admirable series of Monographs on Biochemistry, edited by Drs. Plimmer and Hopkins, a volume on *Oxidations and Reductions*[2] in the animal body is contributed by Dr. Dakin, one of the pioneer workers in this subject. He says:

> The statements that fats and sugars are oxidized in the body to carbon dioxide and water, while proteins yield urea in addition, are no longer considered all-sufficient explanations of the chemical rôle of these substances in the animal economy; the study of chemical structure is rapidly changing the whole aspect of biological science, and we may confidently look forward to the time when the orderly succession of chemical reactions constituting the activities of the living cell will be resolved into their individual phases.
>
> Most of the striking biochemical oxidations of the living cell may be imitated more or less satisfactorily by experiments *in vitro*, and there is no evidence that suggests that the oxidative processes of the living organism differ in any fundamental way from chemical oxidations known to take place in inanimate nature.

The proteins, fats, and carbohydrates are resistant to oxidation under ordinary conditions, and many theories have been put forward to account for the biochemical oxidation—for example, activation of oxygen by its polymerization as ozone, or resolution of the oxygen molecule by nascent hydrogen, or other reducing agent, with formation of water, and an atom of active oxygen. The view which receives support is that the living cells contain labile substances capable of taking up molecular oxygen from oxyhaemoglobin with the formation of unstable peroxides possessing marked oxidizing products. An extraordinary close similarity as regards the types of reactions exists between the oxidations effected in the body and those brought about by the simplest superoxide—hydrogen peroxide. Thus the saturated fatty acids in the body undergo oxidation in the beta position—for example, butyric acid yields aceto-acetic acid; hydroxy acids, such as lactic acid, are oxidized to ketonic acids, amino acids to lower fatty acids with liberation of carbon dioxide, water, and ammonia; glucose may be oxidized to glucuronic acid, benzene to phenol catechol and quinol, and so on. In every one of these cases the oxidation produced *in vitro* by hydrogen peroxide is the same. The author deals in turn with the fatty acids, saturated and unsaturated, the dibasic acids, alpha-amino, alpha-hydroxy, and alpha-ketonic acids, tyrosine, and other related aromatic substances, the oxidation and reduction of amino acids by micro-organisms, the carbohydrates, the purins, and the hydrocarbons, phenols, alcohols, etc. The monograph is one which deserves the closest attention on the part of all those interested in the problems of metabolism.

To the same series Dr. Cathcart has contributed an interesting volume on the *Physiology of Protein Metabolism*,[3] in which he discusses "the more important results published during the last decade, and their bearing upon the work of the earlier investigators." We note that gastric digestion breaks down proteins into products which give the biuret test only after weeks of action *in vitro*, but that the gastric juice helps trypsin to break the protein into amino acids. There is little, if any, absorption of protein in the stomach. There is a curious difference between the action of real gastric juice and that of pepsin powder, for while the former cannot, the latter can easily, break down caseinogen into amino acids. So, too, pancreatin is more powerful than pancreatic juice; test tube experiments may thus give a wrong impression as to the activity of the juices. While protein is mostly absorbed in the form of "abiuret" digestion products, undigested protein can be absorbed from the intestine. Dog's serum is much more easily absorbed from the dog's intestine than horse or ox serum. Ox serum *plus* extract of ox pancreas is absorbed much more easily than ox serum alone. It has been found possible to maintain an animal in nitrogenous equilibrium by feeding it with serum or egg albumen parenterally (by subcutaneous or intravenous introduction), and at the same time giving carbohydrate by the intestine; the intestine probably has a share in the preparation and use of the parenterally fed protein which is brought to it by the blood stream. Thus injected peptone disappears from the blood much more rapidly when the intestine is in than when it is cut out of the circulation. The balance of evidence seems to the author to be in favour of the hypothesis that the synthesis of protein in the body is a function of each individual cell, and that the material which is utilized in this synthesis is circulating in the form of amino acids or groups of these. Pavy held that the whole conversion of food protein into tissue protein was brought about by the lymphocytes in the intestinal wall, and that these by autolysis were resolved into blood proteins. Halliburton has reckoned that there is only about 1 gram of lymphocytes in the blood of a man, and it is difficult to see how this amount could tackle so large a job. All the evidence goes to show that de-aminization is a fundamental process in the metabolism of protein, particularly of that portion which serves for dynamic purposes. The transmutation of amino acids in the body is discussed; the growth of moulds on a medium containing potassium nitrate as the sole source of nitrogen affords evidence of the synthesis of amino acids, for a protein of complex structure is formed, from which glycine, alanine, leucine, glutamic and aspartic acids can be isolated. It is most probable that synthesis of amino acids can also take place in the body of the animal. In discussing the amount of protein daily required, Dr. Cathcart recalls observations of Hamill and Schryver, who found in seven physiologists, living on their ordinary diet, the average intake of protein was 90 grams per diem; also those of Haecker on two herds of cows, one of which was fed on a low protein diet. No particular difference was noted for two years, but during the third year the animals fed on the low protein diet began to fail, and became so ill that the experiment had to be stopped. Restitution of tissue protein is a very slow process when the diet is changed from a low to a high protein diet. The body can make use of its stores of protein during starvation because each tissue contains proteolytic enzymes capable of bringing about autolysis; it is probable that these enzymes are both proteosynthetic and proteoclastic.

> It may be taken as practically proved that carbohydrate in some form or other is absolutely essential for the synthesis of protein within the tissues.

The "toxic" destruction of body-protein in fever may be largely prevented by the intake of carbohydrate. Dr.

[2] *Oxidations and Reductions in the Animal Body.* By Dr. H. D. Dakin. *Monographs on Biochemistry.* Edited by Drs. Plimmer and Hopkins. London: Longmans, Green and Co. 1912. (Roy. 8vo, pp. 143. 4s. net.)

[3] *The Physiology of Protein Metabolism.* By E. P. Cathcart, M.D., D.Sc. London: Longmans, Green and Co. 1912. (Roy. 8vo, pp. 150. 4s. 6d.)

Cathcart himself has shown that creatin appears in the urine as the result of a fast, and disappears if carbohydrate be given. The ingestion of fat increases the output, while carbohydrate notably diminishes it. Leathes and Cathcart observed that voluntary work diminished the output of uric acid, even if the work were excessive; on the other hand, involuntary shivering produced by exposure to cold caused a very marked rise in the output of uric acid. We have cited enough to show how much of interest there is in this little volume, to which an excellent bibliography has been added by the author.

## THE SERUM DIAGNOSIS OF SYPHILIS.

WHILE it may not often be possible for the practitioner himself to apply the "complement deviation" test of syphilis, there can be but one opinion as to the advisability of his mastering the theoretical aspects of the test, and this he may do by mastering Dr. H. NOGUCHI'S book on the *Serum Diagnosis of Syphilis and the Butyric Acid Test for Syphilis*.[4] The book, a review of which has been accidentally delayed, consists of two separate parts. The first deals with the Wassermann-Neisser-Bruck test and its numerous modifications. The reader is taken by easy stages through the necessary groundwork of haemolysis, antibody formation, complement fixation, and antigen action. The language is simple and readily understood, and by the aid of a number of diagrams and coloured drawings any difficulty in grasping the fundamental facts is avoided. The test as first introduced is then described in language equally clear and lucid, the fallacies and the causes and reasons of wrong results are noted and the author's own modification detailed. Other modifications are allotted, but scant space and the remaining part of the first division is devoted to a comparison of his method with the original Wassermann test. We are inclined to approve almost unreservedly of the presentation of the subject up to this point, but—and it appears to us to be a serious "but"—when he formulates his test in order that the medical practitioner may apply it to the serum of his own patients he treads on dangerous ground. A careful study of the description given of the variations obtained by different serologists, and experience of the frequency with which the same serum is differently interpreted, as far as the complement deviation test of syphilis is concerned, should have impelled him to hesitate before suggesting to the general practitioner that he could well undertake this work without special laboratory training, which all are not disposed to undergo. The performance of the Wassermann test, and of its modifications in fact, requires much technical skill and practice. It is not our intention in this place to discuss the merits or demerits of the Noguchi modification of the test. The reader of the book will gain the idea that it is superior to all others; the majority of serologists still prefer the original or Stern's modification. Be this as it may, the author is justified in pointing out to his readers what he regards as the advantages of his method.

The second part is a description of the author's method of estimating an increase of the globulin fraction in cerebro-spinal fluid or serum. The butyric acid test does not appear to have met with much favour, and the majority of workers, especially in German laboratories, prefer Nonne's magnesium sulphate and ammonium sulphate method. But here, again, the author is wise to describe his own in glowing colours. He should not, however, have introduced the subject as if the idea of utilizing this globulin estimation was his own. His description of the significance of the test is fairly sound, and we agree in the main with his deductions. Perhaps a little more emphasis might have been laid on the value of the test when considered together with a cytological examination and with a Wassermann test both of the cerebro-spinal fluid and of the blood. A glossary of terms and list of methods of preparing various antibodies, etc., closes a book which is well worth reading, and which we can honestly recommend to the general practitioner, provided that he recognizes the technical difficulties in performing the Wassermann test, that there are many modifications of the test which enjoy as much popularity as Noguchi's, and that the butyric acid test is one for the approximate estimation of an increase of globulin.

[4] *Serum Diagnosis of Syphilis and the Butyric Acid Test for Syphilis.* By Hideyo Noguchi, M.D., M.Sc. Philadelphia and London: J. P. Lippincott Company. 1910. (Med. 8vo, pp. 179; 14 illustrations.)

## OBSTETRICS.

PROFESSOR WHITRIDGE WILLIAMS has again taken the call for a new edition of his *Obstetrics*[5] as the occasion for a thorough revision. The result is that the new edition exceeds the last by twenty-six pages, but the use of a thinner paper makes a less bulky volume than the first edition. The revision has emphasized the merits which were acknowledged on former occasions, and the reader may turn to the discussion of any of the scientific questions underlying the practice of obstetrics, sure that he will find a fair and judicious presentment of the evidence on which conclusions must be founded. These reviews are all the more valuable in that, in directing his own service, Dr. Williams has touched at so many points the experimental work which has within the last generation become so important a factor in modifying opinion. The sections on the physiology and development of the ovum and on the physiology of pregnancy may be cited as instances where the excellence of statement is conspicuous.

The section on the toxaemias of pregnancy will be found of great interest. The patient suspense of judgement shown in face of the many theories of eclampsia may be commended, and the attention of those who are not already familiar with Dr. Williams's work on pernicious vomiting is sure to be engaged by his detailed discussion of this subject. As has already been pointed out in the BRITISH MEDICAL JOURNAL, Dr. Williams finds in the great rise in the urinary ammonia in toxaemic cases a criterion to distinguish them from those of neurotic hyperemesis. The methods of Kjeldahl and of Folin are used for estimating the total nitrogen and the ammonia respectively, but they are so time-consuming that they require the service of a physiological laboratory. It seems probable that the methods of Groat and of Mathieson, based on the interaction of ammonia and formaldehyde to form hexamethylene tetramine, may prove both accurate and economical. Turning from the scientific foundations of obstetrics to questions of practice, Dr. Williams gives—and gives clearly—the result of his experience, and does justice to the literary evidence for methods he has not tried. His procedure is historical throughout, and gives an adequate presentment of the evolution of methods which has brought practice to its present standpoint. The general result is satisfactory, and the emotions evoked by the discovery that one's own pet methods are not included may be considered salutary. Each section is accompanied by a bibliography rather more extensive than is usual in a textbook, and there is an ample index. With such essential merits it is a matter for regret that rather numerous slips were noted as indicating somewhat slipshod proof-reading.

EDEN'S *Manual of Midwifery*[6] needs no introduction to the student of obstetrics, and the third edition at present before us fully maintains the reputation that it has so rapidly gained as one of the standard English textbooks on the subject. Unlike so many of its compeers, this book moves with the times, and we are pleased to note in the present edition a moderate insistence on the need for a rational asepsis in obstetrics, and the subject is one that might well be still further expanded in the future editions of this work, which we feel sure will be called for. The section devoted to the description of obstetric operations is a distinct improvement. This is a subject in which most definite guidance is desirable, more particularly by those who have not had the opportunity of obtaining their knowledge first hand. It has frequently been said of medical men that they are by nature conservative, and part with their old creeds with difficulty. A very striking example of this is supplied by the tenacity with which English obstetricians cling to a lengthy description of Bossi's dilator. The

[5] *Obstetrics; a Textbook for the Use of Students and Practitioners.* By J. Whitridge Williams, Professor of Obstetrics, Johns Hopkins University, etc. Third enlarged and revised edition. London: D. Appleton and Co. 1912. (Roy. 8vo, pp. 1007; figs. 668; plates 16. 25s. net.)

[6] *A Manual of Midwifery.* By Thomas Watts Eden, M.D., C.M.Edin., F.R.C.P.Lond. Third edition. London: J. and A. Churchill. 1911. (Med. 8vo, pp. 719; 339 illustrations. 15s. net.)

ingenuity that devised its mechanism is undoubted; at the same time it is almost universally condemned as being far too dangerous to be of much practical service. The author claims that in this improved and enlarged edition he has still aimed at the production of a manual suited to the requirements of students and practitioners. He has succeeded. The language is concise, the printing is clear, and the illustrations excellent.

## MILITARY HYGIENE.

The fourth volume of military hygiene,[7] by Professors Bischoff, Hoffmann, and Schwiening, deals with army diseases, more especially the infectious diseases. In the introductory chapter on the etiology of infectious diseases in general, Bischoff lays stress on the fact, which is not always recognized, that the prime source of infection in all diseases is the sick man. Water, food, air, and insects are commonly regarded and spoken of as the source of infection of the particular disease, but these are really only the distributing agents of germs derived from the infected host in the first place. The conditions of military life, which necessitate a large number of men being closely associated with each other during work and at meals, as well as sharing barrack rooms at night, greatly favour the spread of any infectious disease which may happen to be introduced into the community. During the manœuvre season the troops are brought into closer contact with the civilian population, and the supervision of food supplies, etc., cannot be maintained so closely as in barracks; this period is always followed by a rise in the incidence of certain infectious diseases, especially of typhoid and dysentery.

In discussing the general prophylaxis of infectious diseases, Bischoff states that for the spread of an infectious disease the following conditions must obtain: (1) A source of infection must be present. (2) There must be available distributing agents suited to the specific germ of the disease. (3) The germ must reach its new host by its proper point of entry—for example, the *B. typhosus* by way of the alimentary tract. (4) The germ must be capable of giving rise to infection in the host—that is, it must be virulent and in sufficient numbers. (5) The new host must be susceptible to the germ. In view of the above conditions it is obvious that the prophylaxis of the infectious diseases must vary according to the particular germ whose spread it is desired to control—for example, by isolating and destroying infected dogs we try to remove the source of rabies, while by vaccination we try to render the host incapable of being infected. Bischoff then gives a *précis* of the German laws for the prevention of infectious diseases, with a table showing how notification is to be carried out. Since February 28th, 1911, the military medical and civil medical officers of health are required to keep each other mutually informed of the occurrence of any infectious disease in their respective spheres of activity. In the German army the incidence of infectious diseases is steadily diminishing each year, largely in consequence of the thorough training given to German army medical officers in hygiene.

In the section on disinfection Hoffmann reviews the subject generally, and gives a short but very practical account of each of the best known chemical agents employed for this purpose, mentioning especially the purposes for which each is most suited. Formaldehyde vapour is apparently very favourably regarded for the disinfection of rooms, while antiformin is strongly recommended as a bacteriolysin (except for the tubercle bacillus) and for the disintegration and disinfection of organic matter. In discussing disinfection by physical means, Bischoff appears to favour the so-called "vacuum steam disinfector," of which several different patterns are described and illustrated. In this method of disinfection the pressure inside the disinfecting chamber is kept below that of the atmosphere by means of an exhaust pump; the temperature is consequently considerably below that of boiling point, so that woollen or leather articles are not damaged in the process. To render the disinfection efficient in spite of the low temperature, formaldehyde vapour is added to the steam.

Hetsch has been entrusted with the section on immunity, and in forty-seven pages gives a concise but lucid account of natural and acquired immunity, and of serum-therapy.

Nearly half the book is occupied with the epidemiology of the infectious diseases. Tuberculosis in armies receives full consideration; the table on page 175 and the chart on page 176 show how much more prevalent tuberculosis is in the French army than in the German or Austro-Hungarian; the value of tuberculin in diagnosis in detecting early cases of tubercle among soldiers is clearly demonstrated. Typhoid fever and the importance of carriers in the army are fully discussed, but the theory of its spread by dust receives scant consideration and even less approval. When describing antityphoid vaccination by Wright's method it is stated that the bacilli are killed by exposure to a temperature of 60° C. This was formerly the case, but at the present time a lower temperature is employed, as it has been found to be equally efficient while at the same time causing less unpleasant after-effects. In discussing paratyphoid fever it is stated that most of the cases are due to *B. paratyphosus* B, and that *B. paratyphosus* A has little influence in causing the disease. This is certainly not in accord with experience in India, where practically all the cases of paratyphoid fever are caused by *B. paratyphosus* A. Bacillary dysentery is well described as the scourge of armies. Statistics from the Franco-Prussian war are quoted showing that among the German troops there were 38,652 cases with 2,830 deaths, equal to one-sixth of all the deaths from disease. The part played by the body louse in causing the spread of typhus fever, as demonstrated recently by Nicolle, Wilders, and others, hardly receives the attention it deserves.

Among the non-infectious diseases which are included in this volume, heatstroke and the effects of alcohol receive most attention. Both are very fully dealt with; indeed, the minute classification of causes and effects becomes rather confusing and certainly somewhat trying to the reader. An ingenious explanation of *Fussgeschwulst*, which we may translate as swelled foot, ascribes the condition to uneven pressure suddenly applied to a foot the bones and muscles of which have become exhausted by prolonged marching. No mention is made of the fact that the German military boot affords singularly little support to the arch of the foot, and that *Fussgeschwulst* is especially prevalent in the German army. Schwiening's statistics on hernia, showing the number of recruits rejected for this complaint, as also the number of men who on examination were found to present a marked tendency to the development of hernia and the number of these men who did actually develop hernia, are most interesting and instructive.

This volume is fully equal to the high standard of its predecessors, and as a work of reference, in spite of the one or two minor criticisms which we have ventured to make, it should prove a welcome addition to all army medical officers' libraries.

## NOTES ON BOOKS.

The fifth volume of the new series of *Butterworth's Workmen's Compensation Cases*[8] has been issued. It is edited by Judge Ruegg and Mr. Douglas Knocker, M.B., of the Middle Temple. It contains reports of all cases heard in the House of Lords and Court of Appeal in England and selected cases heard in the Irish Court of Appeal and Scottish Court of Session during the period October, 1911, to October, 1912. It is a curious commentary on the hope expressed when the Workmen's Compensation Act was introduced, to the effect that it would be administered with the help of few applications to the courts, that this volume of cases decided on appeal during one year contains nearly 700 pages, excluding a table of cases, a digest of cases, and a very excellent index.

To decide what words should appear in *The Nurses' Complete Medical Dictionary*[9] must have been almost as

[7] *Lehrbuch der Militärhygiene.* Herausgegeben von Professor Dr. H. Bischoff, Professor Dr. W. Hoffmann, and Professor Dr. H. Schwiening. IV Band. Berlin: Hirschwald. 1912. (Roy. 8vo, pp. 515; 2 tables, 39 illustrations. Price M. 7; bound, M. 8.)

[8] *Butterworth's Workmen's Compensation Cases.* Fifth volume. Edited by Judge Ruegg and Douglas Knocker, Esq., of the Middle Temple. Sydney: Butterworth and Co., Ltd.; Calcutta: Butterworth and Co., Ltd. 1912. (Demy 8vo, pp. 772. 7s. 7d. net.)

[9] *The Nurses' Complete Medical Dictionary.* By Miss M. Theresa Bryan. London: Baillière, Tindall, and Cox. 1912. (Demy 32mo, pp. 206. Price 2s. net.)

difficult as to describe their meaning. On this account one is disposed to congratulate the authoress, Miss M. THERESA BRYAN. The definitions are clear, and, so far as we have been able to observe, few terms have been accorded admission which might better have been left out, whilst of terms which occur frequently in the daily life of a hospital few demanding explanation would seem to have been omitted.

The success of the crusade against consumption must in the long run depend upon the good sense of the community profiting by the teaching of the profession. The way of prevention has been clearly defined, and if every one could follow it consistently, the disease might be wiped out. But medical truths, like political fictions, must be repeated again and again in form suitable for the hearers' capacity of reception. Many small books of popular instruction have recently appeared, and another, *Hope for the Consumptive*,[10] from the pen of Dr. GREGSON, of Blackburn, may be added to the list of those which supply an adequate account, couched in terms which can be easily understood. The hope which he holds out to the consumptive centres round the success or failure of tuberculin, but involves careful attention to all the hygienic measures as well. The little pamphlet is well arranged, and is more than worth the modest price asked for it.

Though the industrial classes in America are no doubt very intelligent, one would hardly expect to find in *Electrical Injuries*,[11] a booklet designed for their benefit by Dr. C. A. LAUFFER, a minute account of the execution of criminals by electricity, coupled with a description of the *post-mortem* findings; nor yet a good deal of matter of a purely pathological order. On the other hand, one would naturally look in such booklet for distinct instead of sketchy descriptions of ways of rescuing a person in contact with live wires. The method of artificial respiration recommended, though described as the Prone Pressure method, is ostensibly that of Professor Schäfer, who demonstrated it himself at a meeting of the American Medical Association some years ago. Nevertheless, the directions given for its performance differ in some important respects from those of its author. The booklet, which is very short, concludes with chapters containing some not very explicit instructions in regard to first-aid work and personal hygiene. A number of examination questions thereon of a very elementary kind are given.

[10] *Hope for the Consumptive.* By A. H. Gregson, M.B. Blackburn: George Toulmin and Sons. 1912. (Fcap. 8vo. pp. 60; illus. 6. Price 7d.)
[11] *Electrical Injuries: their Causation, Prevention, and Treatment.* Designed for the use of practical electrical men. By Charles A. Lauffer, A.M., M.D. Fifth edition, first thousand. New York: John Wiley and Sons; London: Chapman and Hall, Ltd. 1912. (Pott 8vo, pp. 83. 2s. net.)

## SEVENTEENTH INTERNATIONAL MEDICAL CONGRESS, LONDON, 1913.

### THE MUSEUM.

A COMMITTEE, with Professor A. Keith, of the Royal College of Surgeons, as chairman, has been formed for the purpose of organizing a museum in connexion with the Seventeenth International Congress of Medicine, London, 1913. The arrangements have been entrusted entirely to this Committee, and it has been invested with the power of acceptance or refusal of any offered exhibit.

It has been recognized that the collection of material illustrative of recent advances in medical science in one centre possesses obvious advantages over the plan of leaving each section to collect and house the specimens and other material required by the readers of papers for their communications separately. A central museum offers to a large number of members of the Congress an opportunity of studying these advances from the available material, and this study is enhanced by the co-ordination of the various departments.

The Committee has drawn up regulations and the following plan of procedure. The museum will consist of exhibits illustrating the subjects which will be discussed in the various sections, and such other material as the Committee may deem of interest or importance. The specimens will embrace the scientific side of medicine, to the exclusion of a commercial element. Excellent accommodation has been secured for the purpose at the Imperial College of Science, South Kensington, and the museum will be arranged in this place, as far as is possible, in correspondence with the sections of the Congress. The co-operation of the officers of each section has been obtained, in order that the collections may be worthy of the occasion. It has further been decided that inasmuch as the meeting is to take place in London, and as the visitors will doubtless desire to inspect the metropolitan hospitals and other great institutions, material will not be collected from the museums of the metropolis. The Committee is therefore seeking exhibits from provincial and foreign institutions and from private collections.

Medical practitioners and scientists who are willing to place at the disposal of the Committee material illustrative of recent advances in any branch of medical science are requested to communicate with the Honorary Secretary of the Museum Committee, Mr. H. W. Armit, Ravenhurst, Talbot Road, Wembley.

The Committee is prepared to defray the expense of transit of the exhibits and to insure them against damage and loss, and will take every precaution to return them in good condition to their respective owners.

Exhibitors will be invited to hold demonstrations in the museum on their own specimens.

Permission has been obtained from the Council of the Congress to keep the museum open for a few days after the Congress has ended, if it be found desirable to do so.

### *Preliminary List of Subjects.*

1. ANATOMY.—Dissections. Macroscopical and microscopical specimens.
2. PHYSIOLOGY.—New forms of apparatus (to be shown by physiologists only). Records of recent observations. Anatomical specimens, with especial reference to reciprocal innervation.
3. GENERAL PATHOLOGY.—Muscular system of the heart. Grafting of normal tissues. The pathology of shock.
3A. CHEMICAL PATHOLOGY.—Pathological conditions due to the effect of diet. Clinical application of pathological chemistry. Chemical pathology of the alimentary tract.
4. BACTERIOLOGY.—Cancer. Filter passers. Leprosy. Anaphylaxis.
5. PHARMACOLOGY.—Non-bacterial toxins and antitoxins. The results of thermal treatment.
6. MEDICINE.—Chronic arthritis. Heart failure. Diabetes. Haemolysis.
7. SURGERY.—Malignant disease of the large intestine. Tumours of the brain. Intrathoracic surgery. Arterial surgery.
7A. ORTHOPAEDICS.—Treatment of spastic paralysis. Treatment of scoliosis. Treatment of ankylosis. Treatment of tuberculous disease of joints in childhood.
8. OBSTETRICS AND GYNAECOLOGY.—Cancer of the uterus. Haemorrhage from the placental site.
9. OPHTHALMOLOGY.—Chronic uveitis. Glaucoma operations.
10. DISEASES OF CHILDREN.—*Coli* infections of the urinary tract. Effect of the ductless glands on development. Surgical treatment of tuberculosis in childhood. Poliomyelitis and polioencephalitis.
11. NEURO-PATHOLOGY.—Motor aphasia, anarthria and apraxia. Tumours of the brain. The myopathies. Parasyphilis.
12. PSYCHIATRY.—The psychoses of infections and autoinoculations.
13. DERMATOLOGY AND SYPHILOGRAPHY.—Exhibits of this section will not be included in the General Museum.
14. UROLOGY.—Early renal and vesical tuberculosis. Malignant disease of the prostate.
15. RHINOLOGY AND LARYNGOLOGY.—Neoplasms of the nose, accessory sinuses and naso-pharynx. Rarer forms of laryngeal tumours. Diseases of the trachea and bronchi. Bronchoesophagoscopy.
16. OTOLOGY.—Exhibits of this section will not be included in the General Museum.
17. STOMATOLOGY.—Periodontal diseases.
18. HYGIENE AND PREVENTIVE MEDICINE.—The mortality of infants during the first four weeks of life. Visual defects in school children. Diseases of the lung due to dust.
19. FORENSIC MEDICINE.—The forensic aspect of syphilis. The psychology of crime.
20. NAVAL AND MILITARY MEDICINE.—Transport of the wounded in hill warfare. Hospital ships. Water supplies in the field. Antityphoid inoculations. Sanitary organization in the tropics. Caisson disease.
21. TROPICAL MEDICINE.—Leishmaniasis. Relapsing fever. Beri-beri. Plague. Tropical diseases of the skin. Filariasis. Worms.
22. RADIOLOGY.—Technical advances in radiography. Radiographs illustrating diseases of various organs, etc.

SPECIAL DEPARTMENT.—The technique of the Museum.

THE Faculty of Medicine of the University of Giessen has conferred the honorary degree of Doctor of Medicine upon Ernst Leitz, jun., of the optical firm of E. Leitz, of Wetzlar, and 18, Bloomsbury Square, London. The University of Marburg conferred the degree of Doctor of Philosophy upon the senior partner of the same firm about a year ago.

## THE MOTOR CAR SHOW IN RETROSPECT.

By H. MASSAC BUIST.

THE Motor Exhibition which closed at Olympia, Kensington, on November 16th contained such a multitude of novelties, all chiefly of a minor character, that it has been almost impossible to make acquaintance with all in the eight days during which the display has been open to the public. But the first and last impression is still that the main advance has been the tendency to fit self-starters and the further growth of the use of electric lighting systems, for plant are now being made on a smaller scale to suit middle and low-powered cars and slender purses.

### SELF-STARTING APPLIANCES.

The self-starters of the electrical sort are fitted to the Cadillac, the White, the Crossley, the Lancia, and the Lanchester, the last-named firm using the Delco or Cadillac system where required.

The Crossley system, which has not been previously mentioned in these columns, consists of a dynamo mounted alongside the engine and chain-driven from the crankshaft, epicyclic gear being contained in an extension of the dynamo bracket. The mere movement of a dashboard lever interposes this sun and planet gear between the chain drive and the dynamo spindle so that the dynamo has a 20 to 1 reduction when it is starting the motor, while the moment the engine begins firing under its own power the gear goes out of action in automatic fashion. In the event of back fire the drag on the brake that applies the epicyclic mechanism automatically releases the gear, which adds about 15 lb. weight to the dynamo. When the dynamo drives the motor, it is series-connected in automatic fashion by the lever on the dashboard. As the engine is driving the dynamo, the dynamo works a shunt wound generator for the purpose of charging the battery of accumulators which supplies the current for lamps and for starting apparatus. The Lancia has a Bosch auxiliary engine starting magneto mounted on the dashboard, and depends on the cylinders being already charged with gas.

The Adler, the Clement, the Star, and La Buire firms make use of the spring system, three of them using the Ever-Ready pattern already described in these columns, while the La Buire device is a combined spring and hand arrangement worked from the driver's seat by a side lever similar to a brake one. By means of a steel cord this lever works a ratchet starting crank in place of the usual starting handle. The lever is assisted by a spring. The ratchet starting crank is fitted with a centrifugal disengaging clutch that flies out of action in automatic fashion immediately the engine begins to turn under its own power, and which is also designed to free itself in the event of back-firing.

### ELECTRIC LIGHTING.

Dynamo lighting sets are being fitted to an increasing number of cars. Thus the C.A.V. type, with the dynamo driven from the rear end of the cam-shaft, is fitted by Armstrong-Whitworth, Austin and Mass, while on the Daimler the same device is belt-driven from the front end of the cam-shaft, on the Brasier it is belt-driven from the water-pump shaft, and on the 20-30 h.p. Picard-Pictet it is driven from a pulley behind the clutch. On the Arrol-Johnston and the Briton the Rotax-Leitner type of dynamo is belt-driven from the cam-shaft, while on the Vulcan it is belt-driven from a pulley between the clutch and gearbox. The Delco system on the Cadillac is shaft-driven by the magneto-spindle, and on the Lanchester it is chain-driven from the transmission shaft behind the gearbox. The Scott-Crossley type of dynamo is driven by an enclosed chain from the crankshaft of the Crossley car. The Rushmore dynamo on the Lancia is belt-driven from the propeller shaft just behind the gearbox, and the Blériot dynamo on the 20-30 Picard-Pictet model is belt-driven from a pulley behind the clutch, while the Ducellier dynamo is mounted alongside the magneto on the Sheffield-Simplex, and is driven by a separate spindle. The Brolt type on the Standard is belt-driven from an aluminium pulley between the clutch and gearbox, while the Lorraine-Dietrich has the C. J. L. machine.

### IGNITION.

In regard to ignition devices, not only the Bosch but several other makers come forward with magneto machines completely enclosed against the intrusion of dirt, dust, and damp, these machines being fitted as standard on quite a number of cars, including, of course, the Rolls-Royce. We may take it, indeed, that the enclosed magneto machine will be a general standard fitting in the course of a few years' time. The matter for marvel is that so many ordinary magneto machines stand up to their work so well in wet weather.

### REFINEMENTS TO ELIMINATE VIBRATION AND RATTLING.

A number of devices have been introduced at the show, too, to prevent coachwork rattling, as instance notably the Van den Plas door-catch, whereby when the door is closed it is gripped tight to the remainder of the body on the Métallurgique chassis.

Absence of rattling as well as efficiency are aimed at in such devices as those for providing adjustment of an automatic sort to prevent the fan-belt slipping, as instance, notably, the Benz, Crossley, and De Dion practices. Another idea for preventing engine vibrations, causing either drumming or minor rattles of the coachwork, has been devised by Mr. Lanchester by furnishing a couple of spindles, each weighing only five pounds, and rotated in opposite directions at double the crankshaft speed. At high engine revolutions these serve as a check of no less than half a ton of force on the unbalanced forces of the engine, and give running as smooth as that on the best six-cylinder motors.

In regard to the question of suspension, while the great majority of the vehicles are fitted with supplementary shock absorbers, the explanation of this is chiefly that the firms responsible for them are interested in these accessories, for, frankly, the best sprung cars of the day are in need of no such auxiliaries, which rather increase the original plunge than act as any material check on the rebound, for which purpose only a very few of the devices have been designed, such as the Gabriel "Snubber," which has nothing whatever to do with the original plunge of the spring, but which comes into operation only when the act of rebounding is occurring. The fact is, the ordinary supplementary coil spring or telescoping pneumatic device came to us first from France, where roads are in much worse condition than here, and where, in consequence, the average chassis is supplied to the user with springs of a stiffness that would almost alarm the average British user. Such springs can stand softening by supplementary devices, which, nevertheless, do not interfere with the sufficiently stiff action of the main spring in preventing the axle bumping against the frame of the car when traversing pot-hole roads. But British cars for average home service do not, or should not, need any such thing unless the springing is mighty bad. Further, these devices are apt to increase lurching tendencies of the body at corners, which are not pleasant, also to let the tread of the tyres and the under portion of the mudguards come into contact when going over lumpy roads. We may take it that great and sudden as has been the vogue for the supplementary shock absorber, it will not endure as a general fitting for many seasons more.

## THE CYCLE CAR AND MOTOR CYCLE SHOW AT KENSINGTON.

### POINTS FOR THE MEDICAL MAN OF SLENDER MEANS.

ON Monday next there will open at Olympia, Kensington, the third annual exhibition promoted by the Cycle and Motor Cycle Manufacturers' and Traders' Union, Limited, when there will be presented not only the latest models in motor cycles, which will be found to contain far more complete equipment than before—so much so, indeed, that one may be surprised at the amount which a motor cycle is expected to carry nowadays—but will also be notable as the first year in which the big manufacturing houses have come forward with propositions in the guise of cycle cars — that is, machines of a limited engine capacity (1,100 c.cm.) and chassis weight (6 cwt.), so that the running costs shall be down to motor-cycle

scale, but which shall nevertheless be equipped with four wheels apiece and with bodywork providing enclosed seats.

It is, at the moment, impossible to give a more elaborate summary of the class than this, for the very simple reason that when it comes to mechanical details there is the widest conceivable divergence of view. More than a score of manufacturers have propositions to present to the public in this connexion, but scarcely any two of them seem agreed as to the manner in which to produce the cycle car in detail. Cheapness, of course, has been had in mind as one of the essentials; it is for this reason that quite a number transmit the power by the belt drive, which is sheer bicycle-maker's practice, whereas nearly all the big manufacturers are at least providing their machines with propeller shaft transmission, a gearbox of sorts, and a differential gear. In the main these are the houses we must look to, because we see in this initial action alone not only the exploiting of proper engineering practice, without which the cycle car cannot come forward as a serious proposition, but also the fact that full value for money can hardly be given by the small maker of this or of any other engineering product, by reason of the fact that only the man with the big output can afford to buy expensive machinery which can do repetition work of the most accurate sort in sufficient quantities to enable such expensive parts as differential gear and so forth to be supplied to vehicles that have to be sold for £125 or less, complete.

### The Proposition Explained.

The interest of the medical man in the whole affair consists in this: that many doctors, particularly the younger men, begin with little or no capital, have long distances to travel each day, but cannot afford to acquire a car, though, for one or other of many reasons, they have no use for a motor bicycle or tricycle of any sort. Each must have a motor vehicle in which he can travel in an ordinary seat, but the costs must not exceed those of a motor cycle for maintenance. Consequently, for such there is no question about buying American cars of any cheapness whatever, because initial outlay is only one part of the problem; tyre bills and petrol consumption are quite 50 per cent. of it. Therefore, the only possible thing is the cycle car. Further, because any given cycle car may look attractive it is no reason that they dare invest in it. They cannot, for example, buy a machine assembled locally, and of a type more or less experimental, so that, in the event of any one part breaking, they would have to get a spare made specially, with results that would be extraordinarily expensive. Such men, in other words, must wait until the big firms take up this proposition, for the big firms have the capital to make in quantities and they have also the responsibility which compels them to store spare parts and so forth.

Further, while having for years past striven to work the big manufacturers up to the pitch of embarking on this new industry that it may be put on a really stable basis, I cannot conceive that any useful purpose is to be served by assuming that merely because they are now coming forward the problem is solved right away. An examination of what is being brought forward convinces me that the majority of manufacturers are regarding their programmes for this year as largely in the nature of the final experiment; that is to say, they have made what experiments they desire themselves, and what they now need is the experience of how these machines will answer in the hands of the public: 1913 is to be to the cycle-car movement the year of the great experiment. That is why so many various constructional systems are being essayed. We shall only know at the end of the season which are the most practicable in order that full value may be given for money. The method that must be adopted is for each maker to find not only how to produce a machine that will answer in the Midlands or the South country, but one which without alteration will answer equally well in the Highlands, in the wildest parts of Ireland, and even in the Dominions and Colonies, for medical men are needing these vehicles in every part of the world. There is a market here of the finest possible character, for where there is room for a thousand cars there is room for a hundred thousand cycle cars produced dead to pattern. There are fortunes in the business, but we cannot get it going on that scale for at least twelve months. Meantime it is exceedingly satisfactory to find that a great number of the makers are beginning on lines which are obviously quite sound, and in this connexion the only puzzle at the moment is how the machines can be produced at the prices being asked. Even the prosperous medical man has an interest in this development, for the cycle car will be invaluable for station work, as a stand-by when one's own car may need temporary repair, as well as for running about at night after the motorman has done a full day's work driving and cleaning up his car ready for the next day, when consequently it is not desirable to disturb him.

### Some Machines to Look Out For.

I do not propose to deal at length with individual cycle cars to be brought forward, as those more suitable for medical men will be more fitly reviewed in a succeeding issue, but I would point out that the propositions may be grouped under various heads, and that apparently the most that can be paid for a cycle car complete with lamps and all is about £185, and the least about £100. Further, for that maximum, or less, what is got is a cycle car in name and costs only; in all other respects it is a big car in miniature in that it has a block-engined four-cylinder motor, conventional steering, change speed gearbox and so forth, as instance notably, on behalf of the British manufacturer, the design brought forward by the Singer Company, or on behalf of Continental practice, the Baby Peugeot, wherein, however, the rear suspension is not of the conventional sort. These machines, however, like the other cheaper cycle cars, are primarily designed for two-seated service, and it will be a grave mistake if any user carries more aboard them, as many will be seriously tempted to do on occasion, for the all-sufficient reason that these vehicles are mighty efficient, being capable of a rate of travel along the road more approximating to the rate of the motor bicycle with side-car than to that of the cheap American vehicle.

Then we come to another group, which may be conveniently described at the moment as the £125 complete class. Of this, there are two notable and strikingly contrasted examples to be brought forward by firms of familiar name. One is the two-cylinder water-cooled Swift with conventional change speed gearbox, live-axle drive, conventional car springing, and all other details; and the other is the Humberette, with a V-set air-cooled engine, out of the ordinary suspension in front by a single transverse inverted semi-elliptic spring, and gearbox combined with the live-axle mechanism. These machines, like the rest, afford a conventional type of car seating, a scuttle dash, high doors beside the occupants, wind screens, and so forth. Then there is the belt-driven variety; very few of the firms of famous name in the motor or cycle industry are going to be associated with this, for though it is admittedly efficient, still it is not motor engineering practice, and is, after all, a makeshift method if for the money a satisfactory gearbox and differential mechanism can be devised.

The machines one has named so far are all constructed on the lines of providing the features characteristic of cars proper, whereas there are others—such as the Bedelia, and so forth—which are vehicles of a kind wholly fresh. Some of them, for example, have the seats, not side by side, but tandem fashion, so that there is a long and easy wheelbase and a very narrow machine. One ingenious vehicle that comes from France has the front axle attached centrally on a swivel principle, so that one wheel can jump a foot or more up into the air, and still the front suspension would not be upset in any way. This, however, is a questionable advantage, because, as far as the stability of the vehicle as a whole is concerned, it means that it is carried on three-point suspension, like a tricycle, and not at four points. The medical man will undoubtedly be better advised—in these initial stages, at any rate—to look rather in the direction of the most conscientious reproductions of car practice generally, as distinct from bicycle-makers' methods. That he will find easy to do if he visits Olympia during next week, for there are to be quite a number of attractive cars in miniature. He should see to it, too, that his machine has differential gear of some sort or another, if he does not want his tyres to scrape themselves away.

H. Massac Buist.

# Nova et Vetera.

## EARLY WORKS ON TROPICAL MEDICINE.

DR. CHARLES SINGER, Assistant Physician to the Dreadnought Hospital, has sent us a reprint of a paper contributed by him to the *Annals of Tropical Medicine and Parasitology* for May, 1912, entitled "Notes on Some Early References to Tropical Diseases." He begins with the reign of Queen Elizabeth, in the closing years of which the enterprise of seamen naturally gave rise to a literature adapted to their needs. In this literature medicine found a place, as in new and strange lands discovered and explored diseases equally new and strange were encountered. In 1598 there appeared a booklet by "G. W.", *The CVRES of the Diseased, in Remote Regions, Preventing Mortalitie, incident in Forraine Attempts, of the English Nation. La honra mas vale merecerla que tenerla. At London. Printed by F. K. for H. L. 1598.* This is, perhaps, the earliest work intended for sailors published in Great Britain. The "forraine attempts" were clearly voyages to tropical America, and the book may be regarded as reflecting the knowledge of tropical medicine gained by the early explorers. The Spanish motto means that it is better to deserve honour than to have it.

G. W., who was a layman in medicine, says:

> The cause that induceth mee publiquelie to expresse the Cure of Diseases of such consequence (which) every judiciall conceite may perceive to have been the only prejudice to our Nation in the expeditions of our time to the Southerne parts: from whence they . . . have returned with renouned victorie, yet exceedinglie opprest withe extreame and penurious sicknesse, that hathe much more prevented the proceeding and performing of their pretensions than the power of Enemies, is not that a purpose, practitioner-like in Phisicke or Chirurgerie, to assume unto me anie knowledge in those Sciences and Faculties: But to possesse all men of remedies for such infirmities, as in my owne experience, have infinitelie impaired English Forces in intemperate Clymates, which I publish, for the good of those whom cause may compell to have use thereof, and would be so censured of all.

The author had voyaged principally to the Spanish Main. In his dedication to Queen Elizabeth he writes of himself that

> In my unjust imprisonment in Spayne, it pleased God to afflict me with a *Tabardilla* Pestilence: whereof being in cure by an especiall Phisition of the King, I observed his Methode for the same, and such other diseases as have perished Your Maiesties people in the Southerne part. Which Remedies have since by my direction taken the like good effects.

The book opens and ends with verse, and even in his Index the author falls into numbers.

The following lines introduce the book, and serve the purpose of a table of contents:

> The Booke's Content.
> The burning fever, calde the *Calenture*,
> The aking *Tabardilla* pestilent,
> Th' *Espinlas* prickings which men do endure,
> *Cameras de Sangre*, Fluxes violent,
> Th' *Erizipila*, swelling the Pacient,
> The *Tinoso*, which we the Scurvey call,
> Are truly here describ'd and cured all.

By "Calenture" Dr. Singer thinks the condition now classed as heatstroke or sunstroke are meant. The word by itself simply means fever, but it is possible that the author intended it to express malaria, which in Spanish is known as *Las Calenturas* (the fevers).

By *Tabardilla* he thinks the author means yellow fever, together with others of a haemorrhagic form of bilious remittent malarial fever, and perhaps sometimes dengue. We may note that it has recently been shown that the disease to which the term "tabardillo" is now applied in Mexico is typhus fever. *Espinlas* Dr. Singer is unable to identify, and the author's description does not throw much light on its nature. He says that to know the Espinlas the following characters will suffice:

> The partie having the Espinlas will be giddie in the head and have pain and pricking at his breast as with many thorns; wherefore I thinke it is so called of Spina and Espina, the Latine and Spanish words for a Thorne.

But the pathognomonic sign is curious:

> There will be upon the Huesso radio (*Anglice*, radial bone) or Focell, being the upper part of his armee, a hand breadth about the wrist, a little Kernell by which it is certainly knowne. And he that hath this Disease will not have appetite to meate and drinke.

By "*Cameras de sangre*, which is the Bloody Flux," forms of tropical dysentery are clearly meant. The writer, like all sailors then and for two and a half centuries afterwards, was familiar with scurvy, which he describes under the Spanish name *Tiñoso*. It is, he says, "an infecting Disease, sufficientlie known unto Seafaring men; who by putrified meates and corrupted drinkes, eating Bisket flowrie, or foule crusted, wearing wet apparell . . . and slothful demeanour . . . obtained the same." The disease, he adds, is "so ordinary at Sea, as it hath seldome seen any Ship or Pinnice, to be foure moneths upon the Voyage . . . but some of the Companie have had this Disease." Exercise the author looked upon as a prophylactic, and "also it is a certaine and assured medicine against this Disease to have such quantitie of Beere, brewed with Graynes and Long pepper, as in the morning twice everie weeke there may be given a good draught to a man. . . . But White Wine or Syder, boyled and brewed with Graynes and Long peper, in like quantitie is very singular good. And it is not fit to suffer the gums to abound with flesh: and therefore sometimes let them bleede and cleere them withe strong Vinegar." Lastly, the patients should not "be suffered to eat any salt meates, if other may be had."

Dr. Singer says the earliest mention of sleeping sickness is usually considered to be in Winterbottom's account of the native Africans in the neighbourhood of Sierre Leone, published in 1803. But there is an earlier one, given by John Atkins, a naval surgeon, on his return from a voyage to West Africa. He saw the disease on the Guinea coast in 1721. His description, which is in the appendix to his little volume entitled *The Navy Surgeon*, is as follows:

> The *Sleepy Distemper* (common among the negroes) gives no other previous notice than a want of Appetite two or three days before; their sleeps are sound and Sense and Feeling very little; for pulling, drubbing, or whipping will scarce stir up Sense and Power enough to move, and the Moment you cease beating the smart is forgot, and down they fall again into a state of Insensibility, drivling, constantly from the Mouth as if in deep salivation; breathe slowly, but not unequally nor snort. Young People are more subject to it than the old, and the Judgment generally pronounced is Death, the prognostick seldom failing. If now and then one of them recovers, he certainly loses the little reason he had and turns Ideot.

The immediate cause he considers to be a superabundance of phlegm or serum extravasated in the brain, which obstructs the irradiation of the nerves. And the treatment is to rouse the spirits "by bleeding in the jugular, quick purges, Sternatories, Vesicatories, Acupuncture, Seton, Fontanels, and Sudden Plunges into the Sea; the latter is most effectual when the distemper is new and the patient as not yet attended with a drivling at Mouth and Nose." John Atkins lived from 1685 to 1757. He was a good observer and a man of some learning and independence of character. This independence led him into disputes and criticisms of his brother officers, which prevented his re-employment in the navy after his return from Africa. References to Atkins's work are found in the *Malay Medical Journal* for April, 1911, and the *Bulletin of the Sleeping Sickness Bureau* for August, 1911, p. 329, and an account of his life is given by Dr. Norman Moore in the *Dictionary of National Biography*.

Dr. Singer goes on to quote an early account of the sand flea (*Pulex penetrans*). The first writer who mentioned the insect seems to have been Fernandez de Oviedo, a Spaniard who wrote in 1547 a book entitled *Cronica de las Indias*. A description of it is also given in a book bearing the curious title, *Les Singularitez de la France Antarctique*. The book was published in 1558.

Dr. Singer's most interesting essay is illustrated with reproductions of title-pages of some of the old works which he has unearthed.

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THE seventh International Congress of Gynaecology, Obstetrics, and Paediatrics will be held at Lille in March, 1913 (25th to 29th), under the general presidency of Professor Pozzi, who will also preside over the Section of Gynaecology. Professor Audebert (Toulouse) has been chosen president of the Section of Obstetrics, and Professor Gaudier (Lille) of that of Paediatrics. Among the subjects proposed for discussion are chorion-epithelioma; cysts of the ovary and pregnancy; and the evolution of tuberculosis in sucklings. The General Secretary is Professor Oui (201, rue Solférino, Lille), to whom all communications relative to the Congress should be addressed.

## THE PARLIAMENTARY COMMITTEE ON PROPRIETARY MEDICINES.

OWING to the exigencies of the parliamentary situation the Committee only held a short session on November 14th.

### ACTION UNDER EXISTING LAW.

The Chairman recalled the statement of Professor Dixon, in his evidence given on October 30th, that the Liverpool Corporation had put into force its powers under the Merchandise Marks Act, and that a severe fine was exacted in reference to the sale of a proprietary remedy in contravention of the provisions of the Act. The Committee had communicated with the Liverpool authorities regarding this statement, and in reply Dr. E. W. Hope, the medical officer of health, wrote that in 1907 information was laid against the vendors of a preparation stated on the labels to contain "the active ingredients and digestive qualities of the gastric juices in a highly concentrated and permanent form." The analyst reported the preparation to be "devoid of gastric juice or any digestive properties whatever." Owing to the impossibility of proving guilty knowledge against the vendor the case was withdrawn, and the stipendiary allowed the defendants five guineas cost.

### MOTHER SEIGEL'S CURATIVE SYRUP.

Mr. C. H. Ratcliffe, joint managing director of A. J. White, Limited, proprietors of Mother Seigel's Curative Syrup, was further examined. Questioned with regard to the attitude of the German authorities towards Mother Seigel's Syrup, the witness said he was without any information on the point. The company was not prepared to go to the expense of placing the preparation on the German market. He was not aware of laws affecting the sale of the remedy passed in Germany in 1903, although the matter had occupied considerable space in the *Chemist and Druggist*. He did not attach much importance to the statement in a book circulated by the founders of the business that:

> An old woman, Mother Seigel, on her last legs with dyspepsia, was led to wander through the lanes, and one day she chewed a leaf of a herb only found in those parts, immediately receiving relief.

The remedy did not now contain any "herbs only to be found in Germany," and he was not aware of any alteration in the ingredients since the business was established.

In reply to questions by Dr. Lynch and Dr. Chapple as to which forms of dyspepsia the remedy claimed to cure, the witness disclaimed any medical knowledge, and said the claims were based on the testimonials received.

The witness regarded the statement as to the estimated cost of ingredients attached to each analysis in *Secret Remedies* as likely to deceive the public. He thought the other expenses of preparation should be mentioned each time instead of in the preface only.

The Chairman: I am not concerned to defend this book (*Secret Remedies*), but I see no ground for a charge of unfairness in this connexion. The statement is perfectly clear.

Replying to the Chairman, the witness said he could not say upon what the claims made on behalf of the preparation were based when it was first introduced and no testimonials had been received.

Mr. Cawley: If the statements in *Secret Remedies* with regard to this preparation are false, as you stated last week, would it not have been well to bring an action against the British Medical Association?

The witness explained that the company was legally advised that it was doubtful if the statements in law constituted a libel. It could only be a trade libel, and that could not be proved without bringing evidence of special damage which would be difficult to obtain. The company had taken means to challenge the statements through its own publicity organization.

Mr. Newton elicited the information that when the company was converted from a private to a public one, the purchase price was £900,000. The witness agreed to the suggestion that the public had no medical knowledge, whereupon Mr. Newton recalled an earlier admission by the witness that the company's advertisements were "written down" to the knowledge of the public, and suggested that it was rather a case of the blind leading the blind. The witness agreed that, in view of the ignorance of the public, the meaning of statements in advertisements ought to be clear. He claimed that in the case of his company this principle was followed.

Before the Committee rose for the day Mr. Glyn Jones gave notice that in his questions he would invite the witness to consider the whole of the paragraphs relating to Mother Seigel's Syrup on pages 176–177 of *Secret Remedies*, and would ask him whether they contained one single definite statement of fact which he was prepared to deny.

## LITERARY NOTES.

IN a leading article published in the JOURNAL of November 16th, we wrote:

> There are persons who cannot bear it even to be hinted that there is anything about them that *smells of humanity*.

The words of Lear are "smells of mortality." Even the most exalted personages would admit that they are, in a manner, human; it is the idea of sharing the mortality of the common herd that is repugnant. Every one knows the story of the reader to a great personage in France who had tactlessly alluded to *le feu roi d'Espagne*. His master's wrath was only appeased by the hasty explanation that it was a title taken by Spanish kings.

No one who has ever come into contact with the inmates of our elementary schools can have failed to observe the enormous amount of deafness and ear disease found amongst the children of the English working classes. The terrible consequences of the combined dirt and neglect to which these cases are exposed in their own homes are commented upon in the October number of *The Child* by Mr. Charles A. Adair Dighton, who gives an interesting account of his method of treating the most frequent manifestation of ear trouble in school children—namely, the ordinary running ear. "The cause of discharging ears," writes Mr. Dighton, . . . "in 90 per cent. of cases is due to the extension of micro-organisms from the naso-pharynx to the tympanum via the Eustachian tube. Therefore the first step in the treatment of chronic suppurative otitis media, or discharging ears, is to clear up all disease in the naso-pharynx." This is effected by means of what Mr. Dighton calls "the posture treatment," which consists in removing the patient's adenoids, etc., together with any pathological exciting cause existing in the naso-pharynx, after which the patient is put to bed in a splint of the writer's own devising which forces him to lie on the diseased side. The pus in this manner being drained away, all that is then necessary is to cleanse the ear night and morning with mops of cotton-wool, and as soon as the discharge diminishes (that is to say, at the end of the first week) the patient is allowed to sit up and the splint is applied only at night, this also being gradually discarded as the patient acquires the habit of sleeping on the diseased side. The whole course of treatment should take little more than a month, and can be carried out in the patient's own home by the district nurse under the doctor's supervision. Moreover, Mr. Dighton claims for it the supreme merit of effecting a permanent cure (if applied at the first sign of discharge) in a large proportion of those cases which now have to be operated upon. The close relation between deafness and what appears at first sight to be undoubted mental deficiency, has often been discussed; and it is frequently a matter of some difficulty to determine whether a backward child is actually lacking in brain power or merely hard of hearing. Much useful information concerning the former state may be found in Mr. A. R. Abelson's interesting article on "Tests for Mental Deficiency in Childhood," which appeared in the October number of *The Child*. The same number also contained a moving account, by Mrs. Mary Higgs, of the miseries of the child vagrant; and a glowing panegyric from Herr Leopold Katscher on the manifold advantages of gardening as part of the ordinary school curriculum.

The International Institute of Social Bibliography was founded in 1905. The head quarters of the institute are situated in Berlin, and there are branch offices in Vienna Paris, and London. The German Imperial Government is subsidizing the institute by granting it a yearly allowance of 15,000 marks, and many corporations and associations

contribute considerable sums to its maintenance. The chief object of the institute is "to assist in the scientific investigation of social subjects." One of the means to the attainment of this end is the publication of a monthly journal, *The Bibliography of Social Science*, in six different languages—German, French, English, Italian, Russian, and Hungarian. The editors are Dr. Hermann Beck of Berlin and Dr. Charles Kinzbrunner of London, and they are assisted by expert correspondents in all parts of the world. This bibliography includes the titles of books and articles in all the principal languages on social science in its widest meaning. Each issue comprises about 80 pages, and registers in the course of a year some 8,000 titles of books and 30,000 titles of essays and articles in periodical publications. The subject is distributed under twenty divisions. These are: Bibliographies and encyclopaedias, history of the social sciences and bibliographies, general sociology, special sociology, theory of political and social economy, applied economics, political science, practical sociology, statistics, demography, colonies, social history, commercial geography, and ethnography. Each monthly part of the *Bibliography* includes all published matter within its scope up to a date two months previous to the publication of each issue. A specimen copy will be sent on application to Mr. C. F. Clay, Manager, The Cambridge University Press, Fetter Lane, London, E.C., to whom all inquiries should be addressed.

Dr. A. Bernhard-Smith writes: Apropos of the doctor-poet, Akenside, recently mentioned in the British Medical Journal, perhaps you will consider the following quotation from Leigh Hunt's essay *My Books* of interest:

I shall never forget the gratitude with which I received an odd number of Akenside, value sixpence, one of the set of that poet, which a boarder distributed among three or four of us, "with his mother's compliments." The present might have been more lavish, but I hardly thought of that. I remember my number. It was the one in which there is a picture of the poet on a sofa, with Cupid coming to him, and the words underneath, "Tempt me no more, insidious love!"

The picture and the number appeared to me equally divine. I cannot help thinking to this day that it is right and natural in a gentleman to sit in a stage dress, on that particular kind of sofa, though on no other, with that exclusive hat and feathers on his head, telling Cupid to begone with a tragic air.

Reference was made in an article entitled "Illness and Intellect," which appeared in the Journal of November 9th, to the fact that Scott dictated the *Bride of Lammermoor* during such intervals of mental lucidity as were left him while taking opium for agonizing "spasms." A full account of this illness is given by his friend James Skene in his *Memories of Sir Walter Scott*. The book was edited by Mr. Basil Thomson, and published by John Murray. Skene says:

Under the infliction of a severe illness Sir Walter had for nearly two years to struggle for his life, and only the natural strength of his constitution at length enabled him to throw it off. But with its disappearance, although he was restored to health, disappeared also much of his former vigour of body, activity, and power of undergoing fatigue, while in personal appearance he had advanced twenty years in the downward course of life; his hair had become scanty and bleached to pure white, the fire of his eye was quenched, his step was more uncertain—he had lost the vigorous swinging gait with which he used to move—in fact, old age had by many years anticipated its usual progress, and had marked how severely he had suffered. The complaint, that of gall stones, caused extreme bodily suffering. During his severest attack he had been alone at Abbotsford with his daughter Sophia before her marriage to Mr. Lockhart, and had sent to say that he was desirous I should come to him, which I did, remaining for ten days, till the attack had subsided. During the course of it, the extreme violence of the pain and spasmodic contractions of the muscles of the stomach were such at times that we scarcely expected that his powers of endurance could sustain him through the trial, and so much was he exhausted by some of the attacks as to leave us in frightful alarm as to what the result had actually been. One night I shall not soon forget; he had been frequently and severely ill during the day, and in the middle of the night I was summoned to his room where his daughter was already standing at his bedside, the picture of deep despair. The attack seemed to be intense, and we followed the directions left by the physician to assuage the pain, which for nearly a full hour bid defiance to our best endeavours. At length it seemed to subside, and he fell back exhausted on the pillows; his eyes were closed, and his countenance wan and livid. Apparently with corresponding misgivings, his daughter at one side of the bed and I at the other gazed for some time intently and in silence on his countenance, and then glanced with anxious inquiring looks at each other, till at length I placed my fingers on his pulse, to ascertain whether it had actually ceased to throb. I shall never forget the sudden beam which brightened his daughter's countenance, and for a moment dispelled the intense expression of anxiety which had for some time overspread it, when Sir Walter, aware of my feeling his pulse, and the probable purpose, whispered with a faint voice, but without opening his eyes, "I am not *yet* gone." After a time he recovered, and gave us a proof of the mastery of his mind over the sufferings of the body. "Do you recollect," he said to me, "a small round turret near the gate of the Monastery of Aberbrothwick, and placed so as to overhang the street?" Upon answering that I did perfectly, and that a picturesque little morsel it was, he said: "Well, I was there when a mob had assembled, excited by some purpose which I do not recollect: but, failing in their original purpose, they took umbrage at the venerable little emblem of aristocracy which still bore its weather-stained head so conspicuously aloft, and, resolving to level it with the dust, they got a stout hawser from a vessel in the adjoining harbour, which a sailor lad, climbing up, coiled round the body of the little turret, and the rabble, seizing the rope by both ends, tugged and pulled, and laboured long to strangle and overthrow the poor old turret, but in vain, for it withstood all their endeavours. Now that is exactly the condition of my poor stomach. There is a rope twisted round it, and the malicious devils are straining and tugging at it, and faith, I could almost think that I sometimes hear them shouting and cheering each other to their task, and when they are at it I always have the little turret and its tormentors before my eyes."

He complained that particular ideas fixed themselves down upon his mind, which he had not power to shake off, but this was in fact the obvious consequence of the quantity of laudanum which it was necessary for him to swallow to allay the spasms. In the morning, after he had got some repose and had become rather better, he said, with a smile, "If you will promise not to laugh at me, I have a favour to ask. Do you know I have taken a childish desire to see the place where I am to be laid when I go home, which there is some probability may not long be delayed. Now, as I cannot go to Dryburgh Abbey—that is out of the question at present—it would give me much pleasure if you would take a ride down, and bring me a drawing of that spot." And he described the position minutely, and the exact point from which he wished the drawing to be made, that the site of his future grave might appear. His wish was accordingly complied with.

The effects of the mind on the body have, as we have often said, been well known to wise physicians, and have been put to use by them. Some remarkable examples are given by Montaigne in his *Essays*. In the First Booke, Chapter XX, he says:

Some man peradventure, by the effects of imagination leaveth the pox or Kings evill heere, which his companion carrieth into Spaine againe: loe heere why in such cases men are accustomed to require a prepared minde, wherefore doe Physitians labour and practise before hand the conceit and credence of their patients, with so many false promises of their recoverie and health, unlesse it be that the effect of imagination may supple and prepare the imposture of their decoction? They knew that one of their trades-master bath left written, how some men have been found, in whom the only sight of a potion hath wrought his due operation: All which humor or caprice is now come into my minde, upon the report which an Apothecarie, whilome a servant in my fathers house, was wont to tell me, a man by knowledge simple, and by birth a Switzer; a nation little vaine-glorious, and not much given to lying, which was, that for a long time he had knowne a Merchant in Tholouse, sickish, and much troubled with the stone, and who often had need of glisters who according to the fits and occurrences of his evill, caused them diversly to be prescribed by Physitians. Which being brought him, no accustomed forme to them belonging was omitted, and would often taste whether they were too hot, and view them well, and lying along upon his bed, on his bellie, and all complements performed, only injection excepted, which ceremony ended, the Apothecarie gone, and the patient lying in his bed, even as if he had received a glister indeed, he found and felt the very same effect, which they doe that have effectually taken them. And if the Physitian saw that it had not wrought sufficiently, he would accordingly give him two or three more in the same manner. My witnesse protesteth, that the sicke man's wife, to save charges (for he paid for them as if he had received them) having sometimes assaid to make them onely with luke warme water, the effect discovered the craft, and being found not to worke at all, they were forced to returne to the former, and use the Apothecarie.

Another case illustrates a method of treatment which we have known practised with success:

A woman supposing to have swallowed a pinne with her bread, cried and vexed her-selfe, even as if she had felt an intolerable paine in her throat, where she imagined the same to sticke; but because there appeared neither swelling or alteration, a skilfull man deeming it to be but a fantasie conceived, or opinion, apprehended by eating of some gretty peece of bread, which haply might pricke her in the swallow made her to vomit, and unknowne to her, cast a pinne in that which she had vomited. Which the woman perceiving, and imagining she had cast the same, was presently eased of her paine.

British Medical Journal.

SATURDAY, NOVEMBER 23rd, 1912.

## THE LISTER MEMORIAL.

Lister's best monument is his work. The very success of the revolution which he brought about in surgery, however, tends, and will tend still more as the developments of his teaching lead further towards the goal at which he aimed, to overshadow his glory as a pioneer. His name is enshrined in the language of surgery, and will live as long as the art which he transformed into a science. But already there are many who, knowing nothing of the difficulties Lister had overcome, perhaps fail to realize the greatness of his achievement. And if this be true even of those of his own household who have entered upon his inheritance, it is far more true of the people at large who reap the fruits of his labours without knowing or heeding how these came to them. Statues and other memorials of soldiers, statesmen, and men who in various ways have played a conspicuous part on the world's stage, are erected almost every day; on the other hand, the man who gives his life to the discovery of the means of relieving suffering is too often without public honour in his life, and after death is quickly forgotten. The time will surely come when those who save life will stand higher in public estimation than those who destroy it; when those who strive for the welfare of the people will be more honoured than those who gain power by appeals to their passions. We welcome the proposal to commemorate one who has placed mankind under such a debt of gratitude in the hope that it may serve to impress a truer notion of greatness on the public mind. At the same time, it may be useful in preventing one of the world's greatest benefactors from fading into a *magni nominis umbra*. It may not be out of place to recall what has been done towards the fulfilment of the proposal.

It was stated in the Journal of July 27th that the Presidents of the Royal Society and the Royal College of Surgeons of England had taken steps to form a large and representative committee for the purpose of establishing a memorial to Lord Lister. That committee, which comprises the leaders of the medical profession besides a number of men distinguished in various spheres, appointed an Executive Committee to frame a scheme and draw up an appeal for subscriptions. On October 23rd a meeting was held at the Mansion House, under the presidency of the Lord Mayor, Sir Thomas Boor Crosby, M.D., in furtherance of the proposal. At that meeting a remarkable speech was delivered by Lord Haldane, who said that Lister's discoveries had been almost as fruitful in turning men's minds to the study of micro-organisms in the territory of medicine as they were in his own province of surgery. The discoveries that had been made in pathology, in tropical diseases, and all other diseases caused by micro-organisms, were due to the new zeal stimulated by the application of Listerian methods to the cognate study of medicine. The man who did that, said Lord Haldane, effected a revolution perhaps more definite, more precise, more far-reaching than anything done even by Darwin and Kelvin. It was fitting, he added, that the Government should be represented at such a meeting, for there was no part of the community that had not benefited by Lister's discoveries; all were his debtors, the humblest and the greatest.

We make no excuse for quoting these words of Lord Haldane, for they justify the appeal for a memorial of Lister that shall be truly national in character. The members of the medical profession may, even in these days when their future is hidden in lowering clouds, be trusted to pay their tribute to the Master to whom they owe so much. But it is necessary to insist on the fact that the public owes far more. If the scope of surgery has expanded to a degree undreamed of half a century ago; if the ravages of septic diseases have been vastly reduced; if incalculable numbers of men, women, and children who not so long ago would have been doomed to a painful death, or perhaps to prolonged suffering and permanent disablement, are restored to useful life—it is to Lister that all this is due. To the public, therefore, the promoters of the memorial may fairly look for a liberal response to the appeal for funds to commemorate one who did more for the relief of the sufferings, not of men only but of animals, than any man who ever lived.

We may remind our readers that, after considering many proposals, the Executive Committee came to the conclusion that the most suitable memorial would be one comprising: (1) A tablet with medallion and inscription in Westminster Abbey; (2) the erection of a monument in a public place in London; and (3) the establishment of an International Lister Memorial Fund for the advancement of surgery, from which either grants in aid of researches bearing on surgery, or awards in recognition of distinguished contributions to surgical science should be made, irrespective of nationality. In an appeal issued by Sir Archibald Geikie (Chairman of the Executive Committee), Mr. W. F. D. Smith (Deputy Chairman), Lord Rothschild and Sir William Watson Cheyne (Honorary Treasurers), and Sir John Rose Bradford (Honorary Secretary), it is pointed out that to carry out the proposals and commemorate Lord Lister's worth in a suitable manner a large sum of money will be required, and it is proposed to form committees in the provinces, in the dependencies of the empire, and in foreign countries, to take such steps as are necessary in order to co-ordinate the collection of subscriptions. Already a number of liberal donations have been received, Lord Iveagh having given £500, Lord Northcliffe £105, Sir William Watson Cheyne £100, Mr. Otto Beit £250, the Duke of Bedford £100, and Sir Ernest Cassel £100. Among the subscribers are Mr. Arthur Balfour, Lord Alverstone, Sir Squire Bancroft, Lord Justice Buckley, Lord Blyth, the Lord Chancellor, Lord Cowdray, Lord Justice Cozens-Hardy, the Duke of Devonshire, Sir James Dewar, Viscount Morley of Blackburn, Lord Moulton of Bank, the Marquis of Lansdowne, Lord Justice Kennedy, the Marquis of Salisbury, Sir Charles Mathews, Sir Arthur Pinero, Lord Rayleigh, the United States Ambassador, the Duke of Wellington, Sir William White, and Mr. Israel Zangwill. It is touching to see in the list of distinguished names a humble donation from a hospital patient of Lister's.

We have only to add that donations may be sent to the Treasurers of the Lister Memorial Fund, Royal Society, Burlington House, W.

It should be mentioned that, in addition to the memorial already mentioned, a suggestion has been made in Glasgow that one of the wards of the Royal

Infirmary in that city, where Lord Lister's antiseptic methods were first put into practice, should be preserved as a museum in which objects of interest associated with him and his discoveries might be exhibited. The Committee has been informed that the directors of the Infirmary have given their sanction to this scheme. Objects, personal or otherwise, associated with Lister's life and work are earnestly desired, and will be gladly received by the Superintendent, Royal Infirmary, Glasgow.

## BOVINE AND HUMAN TUBERCULOSIS.

In the *Bulletin de l'Office International d'Hygiène Publique* for August there is a long and interesting article on the relation between bovine and human tuberculosis, by the Director of the Italian Home Office Bacteriological Laboratories. In this article Professor B. Gosio traces the early opinions on the origin of tuberculosis held down to the year 1883, when Koch discovered the tubercle bacillus and upheld the unicist theory, and from that time onwards, until at the memorable congress in London in 1901 he pronounced in favour of the difference between human and bovine tuberculosis. The controversy resulting from this declaration is sketched, and the various opinions of men and countries and the different results of various experimenters are given. The questions of technique, virulence, and metamorphosis are all discussed calmly and judicially. Then follows a detailed account of the work done in Italy during the last ten years at the request of the Department of Public Health.

In this inquiry Italy, with its numerous districts presenting different conditions of life and offering many diverse circumstances, afforded favourable opportunities for the gathering together of evidence, while former work pointed out the line of research to be followed. This research had both a statistical and experimental side, and when necessary and possible the two types of inquiry ran parallel and mutually helped each other. The main conclusions are, that where there is much tuberculosis in animals there is little tuberculosis in man, and that where there is much tuberculosis in man there is little or no tuberculosis in animals. In an interesting summary presented by Professor Santoliquido he outlines the salient points in the main contribution and discusses this important thesis, "In tuberculosis, what has man to fear from bovine infection?" To come to a conclusion on this very important question he not only takes advantage of the enormous literature existing on the subject, but also considers the ten years' work in Italy, and decides that as far as Italy is concerned there is no relation between human and bovine tuberculosis except in rare cases, and that the true danger in tuberculosis resides in the human carrier—the phthisical patient. Moreover, he contends that where many peasants have become phthisical they have been congregated where human contagion was prevalent. He also concludes that in non-pulmonary forms of tuberculosis there is almost complete agreement in excluding the influence of bovine virus so far as the adult is concerned. In discussing the question of the prevalence of peritoneal tuberculosis in infancy he admits that milk may be a factor of some importance, although in a table in which he sets out the result of careful inquiry in agricultural and industrial districts he comes to the conclusion that the high percentage of peritoneal tuberculosis recorded by British observers as the result of milk drinking cannot be accepted for Italy. He affirms that in the north of Italy, where there is a grave diffusion of bovine tuberculosis and where milk is largely used, peritoneal tuberculosis is not proportionally increased; while in the midlands, where little milk is drunk and where often bovine tuberculosis is unknown, peritoneal tuberculosis is high. He argues that other facts—such as climate, heredity, and habits of life—must be taken into account in coming to a conclusion. In contradistinction to this, our Royal Commission on Tuberculosis came to the conclusion "that a considerable proportion of the tuberculosis affecting children is of bovine origin, and is due to cows' milk." In reviewing the whole position, Professor Santoliquido rejoices over everything done to give the people uncontaminated milk, and urges that all the defences against tuberculosis should be strengthened—propaganda, notification, disinfection, hygienic protection at work, dispensaries, homes for the predisposed, and suitable places for isolation. But, while giving a hearty welcome to all these, he insists that if we are to be successful in the social warfare against tuberculosis we must concentrate all our energies on the phthisical subject, for he is the real danger. Fight bovine tuberculosis by all means, he says, but let us remember that a healthy man has little to fear from bovine tuberculosis. He concludes his highly interesting note by laying it down that the fatal march of this contagious disease will not be stopped even for a moment simply by rendering meat and milk free from infection. In answer to the question whether animals and man can be reciprocally infected, the British Royal Commission reported that this was possible except in the case of avian tubercle. When we ask the same question of the Italian workers, they say with the Japanese, "where there is much tuberculosis in animals there is little tuberculosis in man," and affirm for themselves "that a healthy man has little to fear from bovine tuberculosis."

The difference between their results and those obtained in Great Britain, which at first sight appears irreconcilable, is probably to be explained by a real difference in the incidence of bovine tuberculosis in man in different countries. The investigations carried out in Edinburgh by Mr. Stiles, with the assistance of Dr. John Fraser and Dr. A. P. Mitchell, appear to justify the opinion that there is a noticeable difference in this respect even between Scotland and England. Full reports on these researches have not yet been published, and Mr. Stiles did not touch on the subject in the paper read to the Section of Diseases of Children at the Annual Meeting in Liverpool, and printed in our issue for last week. In his address on the pathology and treatment of tuberculosis of the bones and joints to the American Medical Association last year,[1] however, he said that Scotland was in the unenviable position of possessing a higher ratio of surgical tuberculosis in its population than is to be found in most countries, and that the bacteriological investigations in Edinburgh were confirming the opinion that a large proportion of surgical tuberculosis, at any rate in children, was of bovine origin. He related some very striking cases, and the inquiry now being completed by Dr. Mitchell, Ernest Hart Memorial Scholar of the British Medical Association, may be expected to throw much light on the subject. It will be noted that Dr. Fraser, in the paper published elsewhere in this issue, brings forward experimental evidence to show that in the rabbit infection of the knee-joint with the bovine bacillus produces an intense reaction with acute synovial

[1] *Journal of the American Medical Association*, 1912, vol. lviii. p. 527.

tuberculosis, whereas infection with the human bacillus results in chronic synovial thickening.

Professor Sheridan Delépine, in the very full examination of the question of the share taken respectively by human and bovine tuberculous products in the infection of young children which he gave to the annual conference of the National Association for the Prevention of Consumption last June, stated that as the result of prolonged study of the subject in Manchester he had come to the conclusion that it was possible to say, without fear of exaggeration, that not less than 25 per cent. of the tuberculous children under 5 years of age suffered from infection of bovine origin, and that this estimate wss much lower than one based on probabilities would be.

## THE SPECIAL REPRESENTATIVE MEETING.

THE Representative Meeting has decided not to bang, bar, and bolt the door, but to leave it ajar for the Chancellor of the Exchequer to push open if he will. It has chosen five of its most trusted leaders, who will hold themselves ready to confer with Mr. Lloyd George and to lay before him the reasonable demands of the profession. These five representatives will act as a subcommittee of the new State Sickness Insurance Committee, to which they will report the result of any conference it may be found possible and desirable to hold. In coming to this decision the Association shows itself long-suffering and consistent. It is consistent, for from the first it has expressed itself willing to work a national insurance scheme, provided that the necessary safeguards were established, and in particular that the defects in the National Insurance Bill as originally drafted — defects not removed during the passage of the bill through the House of Commons, and therefore persistent in the Act— were removed. The same willingness to work the medical benefit under the Act, provided it afforded conditions compatible with giving an adequate and efficient service, has again been expressed, and the Representative Body, as has been said, has consented to give a fairly wide authority to its special representatives to seek fair terms of arrangement and to report the result to the Association.

The meeting which assembled on Tuesday morning proceeded at once to the main business for which it had been called together, and to this end it decided to postpone the discussion of the report of the Council until it had dealt with the question whether service should be accepted or not under the existing conditions. The point was brought up at once by a resolution moved on behalf of the Bradford Division declining to take service under the Act and Regulations as at present existing, on the ground that they were unworkable and derogatory to the profession. This resolution was carried with very little delay by an overwhelming majority, after an amendment to replace the words "unworkable and derogatory" by "unsatisfactory" had been rejected. The question as to what action should in consequence be taken came up on a proposal to affirm that the recent offer of the Chancellor of the Exchequer afforded to the British Medical Association an opportunity of conferring with him and with the Commissioners as to the points on which the demands of the profession have not yet been met. The debate actually took place on an amendment affirming that the present situation afforded an opportunity for conference, "with a view to the settlement of the points on which the demands of the profession have not yet been met." The debate was very interesting, as may be judged from the report published in the SUPPLEMENT (pp. 564-7). It showed that the matter was regarded by different speakers from different points of view, depending to some extent at least on the conditions of practice existing in the several districts which they represented. Eventually, on being put to the vote, the amendment was carried by 107 to 84. It then became the substantive motion, when an amendment was moved proposing that the resolution declining to accept service under the present conditions should be sent to the Chancellor of the Exchequer with an intimation that any further proposals of the Government for meeting the grave objections of the profession would receive the careful consideration of the British Medical Association. This proposal was also debated at considerable length, and when it was about to be put a card vote was demanded. A card vote differs from a roll call in that each Representative is credited with the number of members in the Division he represents. The result showed that the votes cast represented 18,561 members, and that there was a majority of 23 in favour of the amendment, the figures being—Ayes, 9,292; Noes, 9,269. It was further stated that if a vote had been taken by a roll call the decision would have been reversed by a majority of 1, the figures being—Noes, 101; Ayes, 100.

In order that a declaration of policy shall be binding on the Association it is necessary that the resolution embodying it should be carried by a two-thirds majority. The figures of the card vote seemed to show that there was no prospect of obtaining such a majority, and this conclusion was reinforced by the comparatively small majority by which the previous amendment had been carried. The Chairman of the Representative Meetings reviewed the situation in a very statesmanlike speech. He pointed out that the votes appeared to indicate that there was no possibility of getting a definite mandate on any line which had actually been before the meeting up to that time—any mandate which could fairly be held to be morally binding upon the Association. The future of the Association, he said, depended upon avoiding a "cave," and he appealed to the meeting to keep its head and make no rash move in one direction or the other. He said that the condition of things upon which the Association had now to judge was completely altered by the various proposals contained in the Provisional Regulations, and the statement of the Chancellor of the Exchequer. Consequently he maintained that it would be improper to attempt to hold the Association strictly to the absolutely defined hard-and-fast decision of a few months ago. Unless the meeting took some middle course upon which those who held the two divergent opinions could unite, a course which would be a reliable and satisfactory guide for future procedure, the Association would be faced with a position in which the Divisions would be more or less at liberty to take each its own line. The public would look to the Association at this crisis to find some common ground. The meeting had clearly indicated that the recent offer of the Chancellor of the Exchequer did not afford an immediate opportunity of going to him, without restrictions or conditions, to talk over the situation, much less to appoint a committee with plenary powers. Mr. Verrall suggested that it might be possible to appoint a committee to report to the Council as to the terms which it might be found possible eventually to suggest for the adjustment of existing difficulties.

Such a committee might convey to the Chancellor the opinion of the Representative Meeting upon the various points at issue. The Chairman was followed by the Deputy Chairman, Mr. E. B. Turner, who spoke in a similar sense, pointing out that it was essential that the meeting should come to a decision which would carry the whole weight of the profession. The meeting at once resolved unanimously to instruct the Council to forward to the Chancellor of the Exchequer a copy of the resolution which it had passed on the previous day by an overwhelming majority, and to draw his attention to the points on which it would be possible for a conference between himself and representatives of the Association to take place. The machinery for carrying out this resolution was then discussed, and it was resolved to elect a State Sickness Insurance Committee in the same way as the previous Committee bearing this name had been elected by the Representative Meeting, but without power to co-opt, and a proposal to appoint a committee of five to interview the Chancellor of the Exchequer was carried. As members of this committee the meeting appointed the Chairman of Representative Meetings (Mr. Verrall), the Chairman of Council (Dr. J. A. Macdonald), the Deputy Chairman of Representative Meetings (Mr. E. B. Turner), Dr. R. M. Beaton (London), and Dr. T. A. Helme (Manchester). This committee of five was instructed to report the result of any interview it might have with the Chancellor of the Exchequer to the State Sickness Insurance Committee, whereupon that Committee would report to the Council. If as the result of the interview modifications in the terms and conditions now existing were proposed, the Council was instructed to report the whole matter to the Divisions in the United Kingdom; the Divisions would then be requested to call meetings to which all members of the profession resident in the area would be invited. At this meeting a vote would be taken as to whether the final terms should be accepted or not, the votes of all present and voting to be recorded in two classes, those of members of the Association and non-members respectively, the combined record of all such votes of members of the Association for or against acceptance of the terms to be decisive, the votes given by non-members to be recorded for general information.

This constitutes a new precedent in the administration of the Association which appears to be justified by the present crisis in its affairs, and the limited time available before an attempt can be made by the Government to put the medical benefits under the Act into force. The meeting spent the greater part of the remainder of the session in framing the instructions which should be given to the committee of five to guide them at their interview with the Chancellor of the Exchequer.

## THE ANTIVIVISECTION CAMPAIGN.

THE action of the Edinburgh students who wrecked an antivivisection shop the other day is deeply to be regretted. It must be admitted, however, that they had considerable provocation. Park orators who incite any section of the community to a breach of the peace are promptly dealt with by the police. The concrete lies which these shops are intended to impress on the public mind are only less inflammatory than attacks on particular forms of religion because they excite so little interest among people in general. None the less, they are standing incitements to disorder, besides being offensive in themselves. We therefore associate ourselves with the dignified protest which Sir William Turner and the professors of the Edinburgh Faculty of Medicine have made against these exhibitions (see p. 1495). There would seem to be the less reason for adopting this plan of campaign at the present time since Dr. Hadwen, President of the British Union for the Abolition of Vivisection, has stated that the report of the Royal Commission was the death knell of vivisection. Representatives of other antivivisectionist societies have been eager in asserting their satisfaction with the report of the Vivisection Commission, although from the tone of their remarks one is tempted to think that the smile of triumph which they put on is really a sardonic grin. It may be, however, that the satisfaction is genuine. There is nothing, we imagine, that they would desire less than the abolition of vivisection, for if that were to come about their occupation and with it their importance would be gone. The situation is one to which Swift's famous argument to prove that "the abolishing of Christianity in England may as things now stand be attended with some inconvenience, and perhaps not produce those many good effects proposed thereby," seems to be applicable. He says it is urged "that there are by computation in this kingdom above 10,000 parsons whose revenues, added to those of my Lords the Bishops, would suffice to maintain at least 200 young gentlemen of wit and pleasure and freethinking enemies to priestcraft, narrow principles, pedantry, and prejudices, who might be an ornament to the court and town." Elsewhere he says: "I am very sensible how much the gentlemen of wit and pleasure are apt to murmur and be choked at the sight of so many draggled tail parsons who happened to fall in their way and offend their eyes; but at the same time these wise reformers do not consider what an advantage and felicity it is for great wits to be always provided with objects of scorn and contempt in order to exercise and improve their talents and divert their spleen from falling on each other or on themselves." We admit that there is a difference here, for the existence of vivisection, so far from preventing the spleen of its opponents from falling on each other, seems to promote this result. But that is another argument against the abolition of vivisection, for their internecine quarrels must give a zest to life which it would not otherwise possess and certainly helps to fill the columns of their otherwise extremely dull journals. To go on with Swift: "If Christianity were once abolished, how could the freethinkers, the strong reasoners, and the men of profound learning be able to find another subject so calculated in all points whereon to display their abilities? What wonderful productions of wit should we be deprived of from those whose genius by continual practice has been wholly turned upon raillery and invectives against religion, and would therefore never be able to shine or distinguish themselves upon any other subject. We are daily complaining of the great decline of wit among us, and would we take away the greatest, perhaps the only, topic we have left? Who would ever have suspected Asgil for a wit, or Toland for a philosopher, if the inexhaustible stock of Christianity had not been at hand to provide them with materials? What other subject in all art or nature could have produced Tindall for a profound author or furnished him with readers? It is the wise choice of the subject that alone adorns and distinguishes the writer. For had a hundred such pens as these been employed on the side of religion, they would have immediately sunk into silence and oblivion." To make the application, as the preachers say, what would Mr. Stephen Coleridge, Dr. Hadwen, or Miss Lind-af-Hageby, do to keep themselves before the footlights if vivisection were abolished? Their occupation would be gone, and although we cannot say we think the gaiety of nations would be eclipsed by their disappearance from the stage, a number of sentimental folk would doubtless feel the loss of the thrills of horror to which they have been so long accustomed.

## THE BATTLE OF THE CLUBS IN AUSTRALIA.

OUR special correspondent in Sydney has from time to time kept the readers of the JOURNAL informed with regard to the controversies which have arisen between the medical profession in New South Wales and the friendly societies. A Warning Notice in respect of such societies in New South Wales has appeared in the JOURNAL since April, 1909. The Australasian Medical Congress in Melbourne in 1908 decided to enforce a wage limit of £204 per annum on the friendly societies, and the medical officers sent notice of termination of their contracts, where necessary. The friendly societies thereupon endeavoured to import medical practitioners from the United Kingdom. In 1910 the medical officers of the friendly society lodges in Goulbourn, New South Wales, endeavoured to induce the lodges to adopt a form of agreement approved by the New South Wales Branch of the British Medical Association, but they declined and formed themselves into an association; the note with regard to Goulbourn was accordingly added to the Warning Notice as to friendly societies in New South Wales in December, 1910. Recently, the medical officers of the friendly society lodges at Casino, New South Wales, have resigned their appointments on account of the failure of the lodges to make an agreement with them on the terms approved by the new South Wales Branch. Casino was added to the Warning Notice on October 5th, 1912. We understand that the lodges have formed themselves into a medical institute, and are informed that they are advertising in the United Kingdom in the hope of inducing medical men to go to New South Wales to take up the positions offered by the proposed medical institute at Casino. The medical profession in the State has very clearly expressed its opinion on the matter through the New South Wales Branch, and we feel sure that any medical man in this country who may see any advertisement of friendly society lodges or medical institutes in New South Wales will fully inform himself of all the circumstances before applying. Any information in the possession of the Medical Secretary of the British Medical Association will be supplied on application to him at 429, Strand, London, W.C., but full information can be obtained from the Honorary Secretary of the New South Wales Branch, Dr. R. H. Todd, Northfield Chambers, Phillip Street, Sydney.

## A SUPERSURGEON.

WHEN a playwright sets out to deal with medical matters it is wonderful how wildly wrong he can go, and it would be hard to find a better illustration of this statement than the play called "Instinct," which is part of the present attraction at the Duke of York's Theatre. The incidents depicted take place in the house of an American surgeon, one Bradford Mandover, M.D., F.R.S., evidently a man of international reputation, since our own Royal Society has conferred on him a fellowship. But Mandover is not only a great surgeon; he is also a superman, or so his brother says. He is also, according to the same authority, a bit of a hero, for once when operating he cut his finger with the lancet, and, instead of stopping to attend to his own hurt as a lesser man would have done, he went on with the operation while the poison crept slowly up his arm. The brother is himself a doctor, and he tells the story in defence of his brother and to vindicate the honour of the profession; but really it would have been kinder to have kept it to himself. If it were to get about that the great surgeon was in the habit of operating with a lancet, and was so unskilled as to cut himself therewith, it could surely do no good to his reputation. Still the story serves to establish the point that there are heroes in the profession who will continue to operate even after they have cut their fingers; and that is certainly a very gratifying thought. The busy surgeon has no time to devote to his wife, a lady who is subject to "heart attacks" for which she takes sodium bromide. Her husband is repulsive to her, but she loves him all the same. When she meets him after an operation she recoils from him because there is a spot of blood on his cuff. Whenever she thinks of him she sees his great hands cutting and tearing. With a husband so absorbed in his work her life is naturally empty; and so is the nursery. The worst of these supermen is that they are so apt to be sterile. Neglected by her husband, she takes to her bosom a consumptive poet, not, be it understood, with any idea of filling the empty nursery, but simply to "mother" him, and so gratify her baulked maternal instinct. The poet comes to her bedroom to bid her farewell before she starts travelling for her health, and while there he has an attack of haemoptysis; as a result of syncope from haemorrhage he falls and fractures his temple—that being the description of the accident given by the brother, who is a physician. It is needless to say that there is only one man who could deal with such a condition, and that man is Bradford Mandover. An operation must be performed, and, as is usual in stage operations, it must be done immediately, and without moving the patient. At first Bradford refuses, but finally his superman surgeon's instinct gets the better of the primitive instinct which bids him turn out his wife's lover to die in the gutter, and he consents to let his great hands cut and tear at the poet whom the doctors, with enviable prognostic confidence, had previously given one year to live. His wife's words have not been lost upon him, seeing that before starting the operation he takes off his coat and rolls up his shirtsleeves. This leaves one with the comforting conviction that never again will he come home from his ghoulish work with bloody cuffs. It is fair to say that, in spite of its absurdities from the medical point of view, the play is theatrically effective, and raises the audience to great enthusiasm. Further, it is an excellent foil to the delicious little Barrie play which concludes the entertainment.

## INJURIES AND DEATHS FROM ELECTRICAL CURRENTS.

ELSEWHERE in this issue will be found an account of an address by one of the very few medical men who have made any profound study of the injuries and fatalities brought about by electrical currents, namely, Professor Jellinek of Vienna. It is of interest despite the fact that Professor Jellinek had very little to add to what he said on the subject at the annual meeting of the British Medical Association in London in 1910.[1] One reason would seem to be the fact that since knowledge on the subject has become popularized in Austria under the influence of Professor Jellinek (the Austrian Minister of Labour in particular having instituted cinematographic lectures to the working classes on the dangers of electricity) the amount of material for study has greatly diminished; in other words, injuries and deaths due to electricity have become much less common in the Austro-Hungarian empire. Professor Jellinek noted this fact when speaking at the meeting mentioned, and the improvement has apparently continued. From what he had to say on these two occasions it would appear to be indubitable that there is no precise limit of voltage above or below which currents are dangerous or otherwise. A large number of circumstances influence the amount of injury any given current may do, and these are all liable to vary in each and every case. Hence the danger of a current cannot absolutely be predicted from its voltage; every current must, therefore, be treated with respect and caution whatever its assumed strength. One factor which Professor Jellinek regards as of much importance is the mental attitude of the patient towards the injury. If he believes he will inevitably suffer severely from contact with a live wire, or receives a shock unexpectedly, he is much more

[1] BRITISH MEDICAL JOURNAL, 1910, vol. ii, p. 515.

likely actually to succumb to its effect than would otherwise be the case. Forensically the point of chief interest, perhaps, is the fact that when a patient survives an electrical shock his recovery is very complete. It would appear that tissues so gravely burnt as apparently to be beyond recovery will nevertheless commonly do so without much pain or suppuration if given an opportunity. A conclusion of still greater practical importance is that very many cases of apparent death from electrical shock are, in the first place at any rate, merely examples of suspended animation, and that there is great chance of restoring the patient to life and complete health if artificial respiration is commenced with promptitude and skilfully maintained for an adequate period. A further point in first-aid treatment which was brought out by Professor Jellinek at Birmingham is that in dealing with persons apparently killed by electrical shocks, the head should not be lowered more than is essential for the application of first-aid treatment by the Schäfer method, for in many cases there are minute haemorrhages in the brain substance. Those conversant with the methods adopted in the laying of electrical wires can probably imagine for themselves how multiple are the circumstances in which shocks of a more or less dangerous character may be received, but they are best realized by pictures such as those by which Professor Jellinek illustrated both his paper before the Electro-Therapeutic Section of the British Medical Association in 1910 and his recent address at the Royal Society of Medicine. Some of them we reproduced in the year mentioned, and others can be found in an admirable atlas[1] devoted to the subject which was published by Professor Jellinek some three years ago. A copy of it can be found in the Library of the Association.

## THE SUCCESSFUL DOCTOR IN THE SEVENTEENTH CENTURY.

Bernier, in his *Histoire Chronologique de la Médecine* (Paris, 1695), gives a summary in verse of the whole duty of medical man. It is addressed to young doctors who wish to succeed in their profession. The doctor who aspires to success, he says, must not be modest, but must do all he can to push himself forward, talking confidently with his brethren. He need not bother about further study, but should use every effort to establish useful connexions. For introduction into families women are useful. Fashionable ladies, devout women, coquettes—all should be concilitated. Every one, even the meanest servant, should be cultivated. The young doctor should bring all his science to bear on satisfying fools. Let him remember that what one says of him another will repeat, and it is from this gossip that celebrity springs. To get the reputation of having much business he must take care not to be found at home; when he is in bed, let his servants say that he has been called out to a case. Let him give out that he has to be up whole nights; that the longest days are too short for him; that he is called everywhere; in short, that the practice so much sought for by others comes to him against his will and overwhelms him. After this he should take care to remark casually that nobody is impudent enough to pay him with cold thanks. This is to make people believe that the harvest is ample and to set every one a good example. Even when his trouble is poorly paid, he should speak of the big fees that are forced upon him for a visit. This hint scattered among good friends may wake up those who are asleep. The young doctor should dress as much like a man of fashion as possible that he may gain the good graces of the ladies. In the street he should bow to one side and the other, courteously saluting every one he passes. He may ride in a chariot or be carried in a chair; two carriers in the street attract much attention. Do not, my son, cries the poet, rising to an enthusiasm befitting the theme, by a foolish modesty lose the chance of making profit. To be something of a quack is a useful thing to a doctor. Let him use well the time of visits, keeping the conversation, as far as he can, on his own merits. Let his successes be attested by dukes and marquises. Everything, it is urged, that can advance one's interest is legitimate; even self-praise is allowed. The poet concludes with an exhortation to the doctor to regulate his conduct by this wise advice, adding that "Virtue in this age is a chimerical good, and if you think of waiting for its help your science will be wasted and you will always crawl." If some parts of this exhortation remind us of the arts of Mr. Robert Sawyer, late Nock'emorf, we have the satisfaction of knowing that at the present day the arts which were considered necessary to success in medicine in the seventeeth century are extinct. The puff, direct and oblique, self-assertion, subtle detraction, intrigue, and the whole art of scheming to attain the lofty ideal *monstrari digito et dicier, Hic est*—of course all these things are unknown in this age of professional probity.

[1] *Atlas der Elektropathologie.* Von Dr. S. Jellinek

## THE ARYLARSONATES.

Some recent researches on the pharmacology of the arylarsonates, the group to which atoxyl belongs, were summarized by Dr. Fortescue-Brickdale at the Congress of Applied Chemistry.[1] The fact that atoxyl can cause trypanosomes to disappear from the peripheral circulation is generally known. Since the introduction of this substance in 1905 by Thomas and Breinl a number of allied substances have also been employed, both on experimental animals and in practice. Many of these have been found to have no trypanocidal action. On the other hand, some, such as acetyl-atoxyl, sodium-3-methyl-4-amido-phenyl-arsenate and sodium-3-methyl-4-acetyl-amido-phenyl arsenate, are trypanocidal for certain trypanosomes in experimental animals. An important factor in the production of this action appears to be the amido group. It is to be noted in this connexion that, in test-tube experiments, mixtures of animal serum and solutions of arsenic compounds which contain the amido group form chemical combinations, whereas compounds without amido groups do not combine with serum proteins. Ehrlich attributes the trypanocidal effect of atoxyl to the production of a reduced trivalent arsenic compound, but Breinl and Nierenstein believe that an oxidation occurs, leading to the formation of inorganic arsenic. Their view is that atoxyl when it enters the animal body is partly combined with the serum proteins by means of the amido group. This combination is then oxidized by a ferment, giving rise to nascent inorganic arsenic which destroys the trypanosomes. At the same time another portion of the atoxyl is reduced, the aniline being destroyed and the trivalent arsenic excreted in the faeces. The arylarsonates have been found of value in various forms of trypanosome infection. *T. brucei*, which causes nagana or tsetse fly disease in cattle, multiplies rapidly in the blood of small laboratory animals, and is thus a convenient member of the group for observation. The immediate effect of the injection of atoxyl is almost always favourable, but the trypanosomes recur in the blood after a longer or shorter interval in spite of repeated injections and few permanent cures have been obtained. Better results have followed the use of a combination of atoxyl with various dyes or with mercury salts. Possibly certain forms of trypanosome survive or are developed which are immune to atoxyl but not to some other drug such as mercury. The long course of infection by *T. gambiense*, the cause of sleeping sickness, makes observation on the ultimate effect of drugs very difficult. Mott, in a recent review of the question, inclines to the view that a cure

[1] *Eighth International Congress of Applied Chemistry*, vol. xix, p. 115.

may take place if the disease is treated before the organisms have invaded the subarachnoid space. The difficulty is to know at what point in the course of the infection the nervous structures have become so damaged that the lesions are likely to be progressive, even if all the parasites were destroyed. In surra, the disease of horses and mules due to *T. evansi*, the most successful results seem to follow the use of atoxyl subcutaneously with arsenious acid by the mouth. In some groups more than 70 per cent. of animals naturally infected have been permanently cured by this method.

## THE TRING MUSEUM.

ON November 17th the Maccabaeans, a club of professional men of Jewish birth, gave a dinner in honour of zoological science, at which the Hon. Walter Rothschild, F.R.S., was the chief guest. Professor Meldola, F.R.S., who was in the chair, in proposing the toast of zoological science, coupled with it the name of Mr. Walter Rothschild, referring especially to Mr. Rothschild's entomological investigations and to the magnificent entomological museum which he has formed at Tring. Professor Poulton (President of the Linnean Society), who supported the toast, spoke of the readiness with which Mr. Rothschild and his collaborators at Tring placed the information in their possession at the disposal of other investigators, including the Oxford school, and of the thoroughness with which the monographs of the Tring Museum were prepared. Mr. L. Fletcher, V.P.R.S., Director of the National History Departments at South Kensington, referred to the fact that Mr. Rothschild was one of the trustees of the British Museum, and had given numerous valuable specimens to its natural history department; while the Rev. F. D. Morice, president of the Entomological Society, dwelt on the services of the Tring Museum to entomology, and mentioned the fact that the museum contained a million and a half specimens, and was the largest collection in existence. Mr. Walter Rothschild, in his reply, confirmed these statistics, and explained that the need for so large a number of specimens was to be found in the requirements of the study of variations in species related to climate and other environmental conditions, and was in part due also to the necessity for the purpose of research of obtaining a large number of specimens of each individual kind. The toast of "The Royal Society," given by Mr. Salaman, was acknowledged by Sir Archibald Geikie, president of the society. During the evening many references were made to the relation of entomology to medicine, and among the speakers were Sir Ronald Ross. The chairman claimed that the importance now found to belong to the mosquito in relation to malaria justified the systematic entomologist, but he, perhaps, hardly realized how little the systematist had done in this direction before the stimulus given to the study of mosquitos by the discovery of the fact that they were the bearers of the malarial disease.

## PROGNOSIS OF HYDATID DISEASE OF HEART.

HOWEVER incompatible a disease may be with the maintenance of life, prognosis is never safe. Supposing that a physician diagnosed hydatid cyst of the heart as big as an orange, he would probably allow the patient a very short lease of life. It might be assumed that such a patient sought his opinion on account of urgent cardiac symptoms. A report recently published by M. André Pélissier[1] reminds us that such a cyst may give rise to no symptoms at all, and may exist, for some time at least, without prejudice to the patient's life. A man came under the care of Dr. Thibierge at the Hôpital Saint-Louis for favus. He had previously been subject to tuberculous disease, and when under Dr. Thibierge an attack of acute peritonitis occurred and proved fatal. Yet neither in the past history, nor in the course of the fatal illness, could any evidence of cardiac disease be brought to light. M. Pélissier states that the condition of the heart, as revealed at the necropsy, was truly astonishing. It appeared to be of a great size and irregular shape. A cyst of the dimensions of a very big orange had developed in the walls of the left ventricle, superiorly on its outer border. It extended backwards, covering the posterior aspect of the auriculo-ventricular groove, and was connected with the left auricular appendix by a bridge of reflected pericardium. The cyst was almost entirely invested by pericardium. There were two other hydatid cysts, both developed in the pericardium, small and pyriform. Both these and the large cystic tumours bore abundant daughter cysts; many in the largest were free, floating about in the characteristic clear watery contents. Although the heart was the seat of advanced hydatid disease, its cavities and its valves, and also its walls beyond the area of the large cyst, appeared quite healthy. This accounts for the absence of cardiac symptoms. A similar latency, Pélissier reminds us, has been noted in most cases of hydatid disease of the heart.

[1] Kyste hydatique du coeur, *Bull. et mém. de la Soc. Anat. de Paris*, June, 1912, p. 257.

## THE FUTURE OF THE MENTAL DEFICIENCY BILL.

ONE of the consequences of the recent check to the Government in the House of Commons and the resulting loss of time is that it has become inevitable that the legislative programme should be curtailed in some directions. The strain of attendance in Parliament prolonged through the winter months is accentuated by the work at Standing Committees in the mornings, and any relief that can be gained in this direction will ease the situation. With regard to the Mental Deficiency Bill, it was clear that a small and determined opposition had it in its power by dilatory tactics to prolong the Committee stage indefinitely and to make it impossible to get the bill through in the limited time available for the Report stage. The Government has therefore announced that it will not press the bill through all its stages this session, but it is anxious that the work so far done should not be thrown away, and has proposed to continue the consideration of Clauses 17, 7, 8, 12, 13, 20 and 24 in Committee, so as to round off the discussions that have so far taken place, and arrive at the fundamental principles as a basis on which a satisfactory and non-contentious bill may be framed for introduction next session. It is hoped that the opposition will thus be conciliated, and that rapid progress may be made with these clauses. There is some talk in view of the new situation of again pressing forward Mr. Stewart's bill, which passed through its Committee stage earlier in the year. It would appear probable, however, that the Government will strongly and successfully oppose the measure being carried in view of the progress made with its own measure, and its declared intention to press the matter next year.

## "CONSUMPTION CURES" IN THE UNITED STATES.

THE following interesting paragraph appears in the November issue of the *Pharmaceutical Era* of New York: "The observance of Sunday, October 27th, was characterized by the denunciation of 'fake cures' for consumption in thousands of pulpits in the United States—carefully prepared and scientifically correct criticisms and recommendations being the rule. The movement was unsectarian in character, was urged by President Taft in a letter in which he formally approved the plan, and had been carefully worked up by the sending of thousands of pieces of literature to clergymen, in which complete information was given as to fraudulent 'cures.' This literature was prepared in the offices of the National Association for the Study and Prevention of Tuberculosis in this city, and was sent for either directly or

through the many State and local antituberculosis societies scattered through the country. It is estimated that fully 100,000 clergymen were thus reached. From records on file in the office of the National Association it is estimated that fully 15,000,000 dollars yearly is spent by sufferers from tuberculosis in such 'fake' cures, and that the number of such 'cures' aggregates 500. None of these remedies will cure consumption, says the association, and no drug, gas, or other material has been discovered which, when eaten, inhaled, or injected into the system, will kill the germs of tuberculosis without doing serious injury to the self-doser. The only real cure for tuberculosis recognized by the National Association is a combination of fresh air, good food, and rest, taken under the direction of a competent physician, and this fact was emphasized generally in the national pulpits, with accompanying rhetorical blasts against drug fakirs in general and consumption cure 'specialists' in particular."

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THE Council and Senate of the University of Sheffield have approved the name of Mr. H. A. L. Fisher, of New College, Oxford, to be recommended to the Court of Governors for appointment as Vice-Chancellor of the University in succession to Sir Charles Eliot, resigned. Mr. Fisher, who is a Fellow and Tutor of New College, Oxford, is well known as a writer on political history.

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AMONG the Fellows of the Royal Society recommended by the President and Council for election into the Council at the anniversary meeting on November 30th are Lieutenant-Colonel A. W. Alcock, Sir Ronald Ross, and Professor G. Elliot Smith. It is recommended that Sir John Rose Bradford and Professor Schuster should be re-elected secretaries. A Royal medal of the society has been awarded to Professor Grafton Elliot Smith, F.R.S., for his researches on the comparative anatomy of the brain. The Buchanan Medal has been awarded to Colonel William C. Gorgas, of the United States Army, for his sanitary administration of the works of the Panama Canal.

# Medical Notes in Parliament.

## National Insurance Scheme.

*Medical Practitioners' Panel.*

SIR PHILIP MAGNUS asked the Secretary to the Treasury, on November 14th, whether he would take steps to secure that a medical practitioner who was struck off the panel by decision after inquiry of the Commissioners should have the right of appeal to a court of law. Mr. Masterman replied, No. Any decision of the Commissioners must be arrived at after due inquiry in accordance with the procedure laid down in the Medical Benefit Regulations, but the matter to be inquired into was of an administrative nature, namely, whether the continuance on the list would be prejudicial to the efficiency of the service. Section 15 (2) (*b*) of the Act represented the deliberate decision of Parliament, which there was no power to reverse, that in any question arising in this connexion an appeal to a court of law would not be possible, or if possible, would not be advantageous to the profession or the practitioner concerned. Questions of a professional nature affecting the status of the doctor as a registered medical practitioner would remain, as hitherto, in the province of the General Medical Council.

*Whole-time Service: Income Limit.*

Sir Philip Magnus asked the Secretary to the Treasury, on November 14th, whether, for the purposes of the National Insurance Act, he would define what was meant by "whole-time service"; whether a person having an income of, say, £300 a year, who accepted a position as secretary, the hours of service being from 10 to 4, at a salary of £150 a year, was compelled to insure; and whether in that case, a medical practitioner, having agreed to take service under the Act, was required regularly to attend such person when ill for the sum of 7s. a year. Mr. Masterman said that the question of the correct interpretation of "whole-time service" in paragraph (*g*) of Part II of the First Schedule of the Act rested primarily in any specific case with the Commission acting judicially and upon consideration of evidence. Any person or his employer might apply for a formal decision of the Insurance Commissioners, under Section 66 of the Act, upon the point, and it would be impossible to give an answer in the case referred to with any certainty except upon a fuller statement of the facts than was possible within the limits of a reply to a question.

*Insured Person's Illness.*

Sir Philip Magnus asked, on November 14th, whether, in the event of an insured person taken suddenly ill in a county other than that in which he usually resided, he was required before being able to secure, under the National Insurance Act, medical attendance to produce such evidence as the committee, with the approval of the Commissioners, might determine; and, if so, whether he would state the nature of the evidence required to be produced. Mr. Masterman replied that the exact nature of the evidence to be required was to be determined before medical benefit commenced by the Insurance Committee, with the approval of the Commissioners, and the matter was receiving the consideration of the committees. Sir P. Magnus: Can the right hon. gentleman say the character of the evidence required? Mr. Masterman: When the committees have decided I shall be able to answer that question.

*Bacteriological Examinations.*

Lord Charles Beresford, on November 13th, asked the Chancellor of the Exchequer whether, in view of the present importance of bacteriological research, and of the fact that an increasing number of diseases depended for their diagnosis and successful treatment upon vaccines, serums, and reactions based upon bacteriological methods, His Majesty's Government intended to provide in populous centres laboratories for the service of insured persons. Mr. Masterman said that it was not the present intention of the Government to take the course suggested.

*Sanatorium Benefit.*

Lord Charles Beresford asked the Chancellor of the Exchequer, on November 13th, whether he was aware that for a considerable period the Portsmouth Board of Guardians had been doing what was now recognized in the National Insurance Act by way of provision of sanatoriums; and whether the Portsmouth guardians might receive a portion of the money which was being allocated for such provision. Mr. Masterman replied that Section 16 of the Act precluded Insurance Committees from making arrangements with Poor Law guardians, and in consequence it was not proposed to make grants under Section 64 to those bodies.

Lord N. Crichton-Stuart asked, on November 14th, how many sanatoriums had been built under the National Insurance Act; how many were in course of erection; and for how many plans had been passed by the Commissioners under the Act. The President of the Local Government Board replied that the Local Government Board had approved, under the National Insurance Act, 117 sanatoriums and hospitals, containing 4,597 beds. The erection of new sanatoriums and the extension of existing buildings were now under consideration generally by local authorities, who were formulating complete schemes for the treatment of tuberculosis. In reply to a further question, he said that a large number of suitable places not being used for other infectious diseases had been very wisely and economically devoted to tuberculosis.

Sir C. Kinloch-Cooke asked how many consumptives there were in the country, and what proportion the number 4,578 bore to that number. Mr. Burns replied that 70,000 people died in the United Kingdom every year and 300,000 were ill; 9,000 beds were wanted, and in four months, under the Insurance Act, accommodation had been provided for nearly 4,600.

Sir C. Kinloch-Cooke asked whether, as sufficient bed accommodation for 4,578 persons had been secured,

the remaining beds would be found in the next two months. Mr. Burns said that by the time the 9,000 required the beds, he had not the least doubt but that that number would be available.

Captain Faber asked whether county hospitals, where other people were taken care of, were being used. Mr. Burns replied that in every case where the local authority could avail themselves of sanitary hospitals owned by county councils or borough councils they had done so; and where there was equally good or better accommodation in possession of voluntary institutions, they had very sensibly sent their tuberculous patients to these institutions. Sir C. Kinloch-Cooke asked whether there were not words in the Act which made it impossible for certain local authorities to take advantage of the Act. Mr. Burns said, No. Under Section 64 it was possible for a county council which previously could not provide hospital or sanatoriums now so to do, and in each of those cases he had sanctioned a token grant of £10 to enable them to proceed with their scheme.

On November 14th the Earl of Kerry asked how many county committees appointed under the National Insurance Act had submitted schemes for dealing with sanatorium benefit; and in how many cases such schemes had been approved or rejected by the Insurance Commissioners. Mr. Masterman said that all the county insurance committees in England had submitted to the Commissioners arrangements for the provision of sanatorium benefit. In all but one of these the arrangements for the treatment of persons recommended for the benefit had been approved by the Commissioners. In Scotland twenty-five county insurance committees had submitted schemes, of which twenty-two had received full and one partial approval, while the remaining two were now under examination. In Ireland twenty-eight county committees had submitted schemes, of which all had received approval as far as they relate to treatment in sanatoriums. In Wales all the county committees had submitted schemes and obtained approval for them. In the few cases in which no schemes had yet been submitted the Insurance Commissioners were in communication with the Insurance Committees on the subject.

Mr. Touche asked whether any, and, if so, what, arrangement had been made for utilizing the institutions under the control of the Metropolitan Asylums Board for treatment of persons suffering from tuberculosis who were entitled to sanatorium benefit; and if it was proposed to introduce an amending bill to enable the London Insurance Committee to enter into the necessary arrangements. Mr. Burns said that he had nothing at present to add to the answer which he gave on November 12th to the hon. member for Plymouth (BRITISH MEDICAL JOURNAL, November 16th, p. 1415).

In reply to Mr. Lardner, on November 14th, Mr. Birrell said that the Women's National Health Association had applied for £25,000, which had been granted. The committee of management of Newcastle Sanatorium had applied for £10,000, and the Local Government Board had intimated that any expenditure which the committee might undertake on behalf of county councils would, with the approval of these councils, be granted. The county councils had applied for a share of the grant on a basis of population, and the grants shown in the following statement had so far been approved, subject to details of expenditure being in accordance with the Local Government Board's requirements:

| County Area. | Share of £120,000 allocated on the basis of population. | County Area. | Share of £120,000 allocated on the basis of population. |
|---|---|---|---|
| *Counties.* | £ s. d. | *Counties.* | £ s. d. |
| Antrim ... ... | 5,298 19 7 | Tyrone ... ... | 3,899 10 8 |
| Armagh ... ... | 3,287 19 5 | Wexford ... ... | 2,795 9 7 |
| Clare ... ... ... | 2,849 0 6 | Wicklow ... ... | 1,659 8 10 |
| Cork ... ... ... | 8,671 16 7 | | |
| Down ... ... ... | 5,584 6 3 | *County Boroughs.* | |
| Dublin ... ... ... | 4,712 2 7 | Belfast ... ... | 10,576 12 3 |
| Galway ... ... ... | 4,980 16 4 | Cork ... ... ... | 2,095 14 10 |
| Limerick ... ... | 2,857 14 10 | Dublin ... ... | 8,331 6 1 |
| Longford ... ... | 1,197 15 1 | Limerick ... ... | 1,052 16 8 |
| Mayo ... ... ... | 5,252 17 4 | Londonderry ... | 1,114 13 2 |
| Sligo ... ... ... | 2,160 11 6 | Waterford ... ... | 750 13 9 |
| Tipperary (N. Riding) | 1,718 15 2 | | |

*Tuberculous Patients.*

The Earl of Kerry asked, on November 14th, if any scheme made by a county committee on the basis of the 1s. 3d. per insured person *plus* a county rate for the treatment of all tuberculous persons in that county had been rejected by the Insurance Commissioners on the ground that 6d. out of the 1s. 3d. must remain intact for the purpose of domiciliary treatment. Mr. Masterman, in reply, said that the Insurance Commissioners had not rejected for the reason indicated any scheme of arrangements proposed to be made by an insurance committee with a county council. They had, however, found it necessary in some cases to advise insurance committees that such arrangements must be framed with due regard to the proposal that 6d. out of the 1s. 3d. per insured person available for sanatorium benefit should, after January 12th next, be allocated to that part of sanatorium benefit which consisted of domiciliary treatment.

**Government Medical Service (West Africa).**—Mr. MacCallum Scott asked the Secretary of State for the Colonies, on November 14th, how many European and non-European doctors, respectively, were in the medical service of the Government in the British colonies of West Africa. The Secretary of State for the Colonies said that the number (including those employed in the British protectorates) were respectively 206 and 8. In reply to a further question, Mr. Harcourt said that the number of Government medical officers in the British West African dependencies who were allowed private practice was 189 (including eight non-Europeans). In Sierra Leone, the Gold Coast, and Southern Nigeria they were allowed to use in their private practice drugs from the Government stores on payment. The rates charged were calculated at an amount varying from 25 to 35 per cent. over cost price, and in the opinion of the local administration there was no reason to suppose that this system gave the Government officers any advantage over private practitioners. Mr. Harcourt, in reply to a subsequent question, said he would consider the point of native doctors obtaining Government drugs for private practice. Mr. Harcourt further stated that natives in the employ of the British Government in West Africa received gratuitous attendance from Government medical officers. The allocation of that duty to individual medical officers was a matter of local administration. He had no information as to the extent to which the patient was allowed to exercise a choice of medical officer, where opportunities for such choice existed, but said he would obtain it. Mr. MacCallum Scott asked how many hospitals in British West African Colonies had and how many had not attached to them qualified medical attendants other than European. Mr. Harcourt regretted that he did not have the information asked for. The duties and stations of medical officers in West Africa varied continually, and were determined by the local administration in accordance with local exigencies.

**Compulsory Notification of Ophthalmia.**—In reply to Mr. Pointer the President of the Local Government Board, on November 18th, said that he had sanctioned the compulsory notification of ophthalmia of the newly-born in 216 districts with a population of 11,497,277, and he was considering the question of extending the requirement of compulsary notification of this disease to the whole country. There was no present intention of extending sanatorium benefit to this disease under the National Insurance Act, or of making a grant in respect of treatment.

**Cost of Public Vaccination.**—Mr. James Parker asked the President of the Local Government Board whether, in view of the decrease in the number of public vaccinations now being performed as compared with the totals before the passing of the Vaccination Act, 1907, he proposed to make a corresponding reduction in the forthcoming estimates for services connected with the administration of the Vaccination Acts, including the provision of calves and the manufacture and preparation of vaccine lymph. Mr. Burns replied that the amount estimated to be required in the current financial year in respect of the services referred to was considerably lower than the estimates for the period previous to the passing of the Vaccination Act, 1907. The practicability of still further reducing the estimate was receiving consideration.

# England and Wales.

[FROM OUR SPECIAL CORRESPONDENTS.]

## LONDON.

### TUBERCULOSIS TREATMENT.

ACTING on the suggestion of the Local Government Board, the Public Health Committee of the London County Council addressed a letter to the Metropolitan Asylums Board, asking the managers to confer with the Council and the London Insurance Committee on the proposal that the County Council should make arrangements through the Metropolitan Asylums Board for the reception and treatment of insured persons suffering from tuberculosis.

At the meeting of the Metropolitan Asylums Board on November 16th the Chairman and Vice-Chairman of the Board were appointed representatives to confer with the Public Health Committee of the London County Council on the subject.

A request by the St. Pancras Borough Council that, subject to the consent of the Local Government Board to the appropriation of accommodation, advanced cases of phthisis might be received at metropolitan asylums, was referred to a committee for consideration.

### WATER SUPPLY.

We have received the report (dated September 5th, 1912) of Mr. C. Perrin, Water Examiner appointed under the Metropolis Water Act, 1871, on the condition of the London water supply during the month of July, 1912. He states that the mean rainfall during that month at twelve stations selected as giving equal representation for all parts of the Thames Basin was 2.70 inches, being 0.45 of an inch above the average mean rainfall for that month during the previous twenty-nine years. The average daily natural flow of the Thames at Teddington Weir during the month was 737.4 million gallons, being 184.3 million gallons above the daily average for the twenty-nine preceding years. The maximum daily flow was 966.4, and the minimum 591.9 million gallons. The average daily flow of the Lee at Feilde's Weir was 51.822 million gallons, the maximum daily flow 72.837 million gallons, and the minimum 42.822 million gallons. The general rainfall of the whole valley above Feilde's Weir was 2.04 inches. The following statement shows the sources from which the water supplied by the Metropolitan Water Board during the month was obtained, the average daily supply from each source, and the relative proportions of the supply from each source:

| District. | From the Thames. | From the Lee. | From Springs and Wells. | From Ponds. | Total Supply from all Sources. |
|---|---|---|---|---|---|
| Eastern ... ... | 7,193,600 | 41,705,900 | 9,142,700 | — | 58,042,200 |
| Kent ... ... | — | — | 23,250,900 | — | 23,250,900 |
| New River ... | 14,425,200 | 21,409,500 | 15,757,400 | 83,900 | 51,676,000 |
| Southern ... | 66,046,700 | — | 1,938,100 | — | 67,984,800 |
| Western ... ... | 68,080,100 | 65,300 | 45,200 | — | 68,190,609 |
| Supplies in bulk | 1,786,903 | — | 438,807 | — | 2,225,710 |
| Total ... | 157,532,503 | 63,180,700 | 50,573,107 | 83,900 | 271,370,210 |
| Percentage of total supply... | 58.051 | 23.282 | 18.636 | 0.031 | = 100 |

The total number of supplies furnished during the month within the Water Board's area of supply was 1,109,801. The total supply divided by a number of supplies shows a daily average of 243 gallons for each supply.

Mr. Perrin gives in an appendix the report on the results of the chemical and bacteriological examination of the London waters for the month of July by Dr. Houston, Director of Water Examinations, Metropolitan Water Board, and also an advanced report giving briefly the general chemical and bacteriological results for the month of August, 1912.

## SOUTH WALES AND MONMOUTHSHIRE.

### INFANT AND DOMESTIC HYGIENE.

THE fourth year of the work carried on in concert by the health authority and the laity of Newport, with the object of improving infant and domestic hygiene, ended on September 30th, and the report relating to it confirms a general belief that it is working on the right lines. As many as three schools for mothers are now at work in the town, and the attendance thereat is increasing. Among the infants of these mothers the infantile mortality in the period under consideration equalled a rate of only 54 per 1,000, an excellent figure, seeing that the population of Newport is mainly industrial. Over 3,989 quarts of milk were supplied to 136 necessitous mothers (the number including nine expectant mothers and thirteen cases of twins), the total expenditure thereon being only £52 11s., although the milk was of excellent quality, containing nearly 17 per cent. over the official standard for milk fat. The classes for cutting out and making babies' garments proved highly popular. Up to the present a maternity benefit club has been maintained, and a considerable number of accounts have been opened and closed during the past years; it seems doubtful, however, whether this part of the work will be continued when the maternity benefit clauses of the National Insurance Act come into operation. The work of the society also includes the delivery of health lectures and the lending of patent playgrounds, these being enclosures some 4 ft. square, with sides about 2 ft. 6 in. high, in which small children can safely play without being constantly watched by their mothers. During the distress brought about by the coal strike the society organized a distress fund for the benefit of expectant mothers and of children under 2 years of age, and the mothers of such children. As for finances, last year, in consequence of material expansion of the work, the expenditure was considerably higher than in the previous period; but it amounted to a very small sum in comparison with the benefits in view. From the beginning of its labours the committee has worked hand in hand with the health department of the corporation, several of whose officials, including the medical officer, Dr. Howard Jones, and the honorary secretary of the society, Mr. P. E. Jones, are members of the staff of both bodies. The society has only two paid officers on its staff, these being two health visitors supplied and paid by the corporation. The rest are all voluntary workers, which accounts for the lowness of the expenditure—less than £115. That the society, whose full name is the Infantile Health Central Committee, is obtaining valuable results would seem to be proved by the figures relating to infantile mortality at Newport. The mean rate for the ten years ending September 30th, 1912, was 141.9 per 1,000 births, while in the year just concluded it was only 108.

### WELSH RED CROSS UNIT.

At the request of the British Red Cross Society, a Welsh Red Cross unit has been organized by Mr. Lynn Thomas, C.B., secretary of the society for Glamorganshire. The unit consists of three doctors, three dressers, two cooks, five nursing orderlies, and five orderlies for general duty. Unfortunately, immediately before the unit started, Dr. Ivor Davies was taken ill. It left on November 12th for Belgrade, where, according to the dispatches of the war correspondents, the need for medical assistance is very great, owing to the fact that the city has been almost denuded of medical men in order to supply the Servian army in the field. The cost of equipping the unit was £1,500, and it is estimated that £1,000 a month will be needed for maintenance. Liberal contributions have already been made by many leading Welshmen; but an appeal is made for further contributions, which should be made payable to the Welsh Red Cross Society Balkan Fund and sent either to the Honorary Treasurer, Mr. David Davies, M.P., The Offices, Llandinam, or to Mr. Lynn Thomas, 21, Windsor Place, Cardiff.

### KING EDWARD VII HOSPITAL, CARDIFF.

At the last Board of Management meeting, Colonel Bruce Vaughan announced that the King Edward Memorial Fund in connexion with the hospital had now reached the

sum of £26,000. The retiring Lord Mayor (Sir John Curtis) had collected £1,600, and would have increased this sum but for the coal strike. Colonel Vaughan also announced the gift of 1,000 guineas from Mrs. Williams, of The Heath, to endow a bed, and a legacy from the late Mr. William Rees, of Cowbridge, of £720 for any object the finance committee thought proper.

# Ireland.

*(FROM OUR SPECIAL CORRESPONDENTS.)*

### An Antivivisection Meeting.

An antivivisection meeting was held one afternoon last week in Dublin, and was addressed by Miss Lind-af-Hageby. In her speech she said that from the report of the Royal Commission they would see that the antivivisection movement had amply justified itself, the evidence given at the Commission showing that there was the greatest need for legislative measures to do away with the cruelty that was legally permitted under the Vivisection Act of 1856. She concluded by saying that the permission of vivisection of animals resulted in experiments on human beings, as the vivisection school brought about a lust for experiments that was dangerous. Lord Justice Cherry, who presided, apologized for the small attendance, explaining that it was due to the fact that a meeting for the Society for the Prevention of Cruelty to Children was being held just then. He called this a meeting of a kindred nature. Such a description would probably not be accepted by the majority of members of the latter society. We congratulate the Dublin public on their choice of meeting.

### South Dublin Union and the Anatomy Schools.

Some time ago certain members of the Dublin Corporation proposed that in view of the demands made by the medical profession in regard to the National Health Insurance Act, the Dublin unions should by way of retaliation be asked not to send unclaimed bodies to the schools of anatomy. At the last meeting of the South Dublin Union a guardian moved that the sending of bodies of the destitute poor who die in the union to schools of anatomy was a most objectionable practice, and that the master be instructed to see that all bodies not claimed by relatives were decently interred. The mover said that to be consistent those in favour of the present policy should offer their own bodies after death to the anatomy school. It was answered that many did, and both the Chairman and a lady guardian stated that they would be quite willing to give their bodies. It was clearly pointed out that much harm would be done if this motion were carried, and that the poor would be the chief sufferers, as they would have to employ doctors who would be working in the dark owing to insufficient teaching, whereas the rich could go elsewhere for medical advice. The motion was defeated by 32 votes to 6.

### Vaccination in Ireland.

Until recently Ireland has been little troubled in comparison to England by the antivaccination craze, but within the last few years agitators have been steadily at work throughout the country, and the results have been shown by the action, or rather want of action, of various boards of guardians. We are glad to see, therefore, that last week the Boards of Guardians of two districts showed their determination to enforce the Act. At Tullamore the medical officer in presenting his half-yearly report drew attention to the steady increase in the number of vaccination defaulters, and to the serious risk to the public health involved. It was decided by 10 votes to 4 to put the Vaccination Act in operation. The Navan Board of Guardians recently came to a similar decision, and at their last meeting the chairman refused to accept a notice of motion to rescind it. At the first annual meeting of the Dublin branch of the Irish Antivaccination League, held last week, the President in his address stated that the year had been very successful; both the Dublin unions had been pledged not to enforce the penal provisions of the Irish Vaccination Acts. All the Dublin members of Parliament had been approached, and had agreed that the law in its present form was intolerable and could not much longer exist. Two million children were exempted in Great Britain and small-pox had not increased; in fact it declined in proportion to the decrease in vaccinations. The branch had asked the Local Government Board to frame a regulation whereby the "conscientious objectors" would not be harassed, but had been told by the Board to go to Parliament. The same authority had admitted that arm-to-arm lymph was advocated and used by some medical officers. The secretary charged the Local Government Board with sending a letter to all relieving officers in Dublin asking them to disregard the orders of the boards of guardians, and to continue sending out the threats of prosecution and imprisonment, but it had been resolved to retaliate, and he was arranging to picket all the dispensaries.

### Cerebro-spinal Meningitis in Fermanagh.

Another outbreak of cerebro-spinal meningitis (spotted fever) has occurred in county Fermanagh. A man has been admitted to Lisnaskea Union Hospital in a critical condition.

### Election of Medical Officers.

At a meeting of the Monaghan Board of Guardians, Dr. Michael Coyne (Monaghan) was elected to the position of medical officer for Scotstown Dispensary District at a salary of £125 and £30 allowance for rent. At the last monthly meeting of the Waterford Corporation, Dr. J. J. Hogan, resident surgeon County and City Infirmary, was elected medical officer under the Tuberculosis Act. At a meeting of the Ballymahon Board of Guardians, a letter was read from the County Medical Association objecting to the appointment of an outsider as medical dispensary locumtenent, as the board of guardians had passed a resolution that these appointments should only be given to Poor Law medical officers. The chairman and several members said they would make any appointments they liked, and would not be dictated to by the Medical Association.

### Consumption Sanatorium Destroyed by Fire.

Last week the Queen's County Sanatorium for Consumptives was totally destroyed by fire. The building, which stood in the grounds of the Queen's County Infirmary at Maryborough, was erected by public subscriptions, the foundation stone being laid at the end of September, 1910. In May, 1911, the sanatorium was opened by Lady Aberdeen, and handed over to the charge of the Committee of Management of the County Infirmary. The fire originated in one of the private apartments, and though help was rapidly given from the convict prison on the opposite side of the road, as well as from the district lunatic asylum and by the police, the whole structure, which was of wood and iron, was within two hours completely destroyed. The inmates, five in number, were removed to the infirmary, and a considerable quantity of the furniture was saved. The original cost of equipment and erection was about £1,000; it is stated that the damage is covered by insurance.

### Salaries of Medical Officers.

At a recent meeting of the Carrick-on-Suir Guardians a resolution was moved to increase the salaries of the four medical officers, and fix a scale of increment for every ten years' service. The present salaries are the same as they were sixty years ago. Two medical officers have only £80 a year, and none have over £120, and their terms of service range from fifteen to twenty-eight years. On a division the voting was equal, and the motion therefore fell through. The Baltinglass Board of Guardians recently introduced an initial salary of £173, rising by quinquennial increments to £200 for the medical officer of Rathvilly District. The Local Government Board stated that this initial salary was much in excess of that paid as initial salaries in the adjoining districts; but as the guardians considered it suitable in the circumstances of the district, and confirmed their original resolution, the Local Government Board has decided not to offer any further objection, and has accordingly sanctioned the salary.

### Women's National Health Association.

The Women's National Health Association obtained a grant of £25,000 out of the sum of £145,000 which is Ireland's share of the £1,500,000 voted to the United Kingdom for the erection of sanatoriums. Two sanatoriums have already been established with this money—Peamount and Rossclare; but the hurry with which the whole thing has

been done, and especially the trouble about finding water at Peamount, has apparently bred suspicion in the minds of county councillors, and they may probably now regret the haste with which they made arrangements to take beds at Peamount. Last week the Tyrone County Council rescinded its resolution to this effect, and arranged that a scheme should be drawn up for making local provision for tuberculous patients. The latest suggestion of the Women's National Health Association is contained in a circular letter addressed to the boards of guardians throughout the country, inviting them to allow the association to employ the dispensary midwife to attend patients qualifying for maternity benefit, and saying that the association would supplement the salary of the midwife so as to make it £1 a week, on condition that the midwife gives up private practice and attends only such insured persons as the association may make an arrangement with, and looks after the babies for the first month after birth. This scheme, however, does not appear to have found favour with the various boards of guardians so far, most of them having merely marked it "read."

### Foreshore of Belfast Lough.

The condition of the foreshore in Belfast Lough has long been the bane of public boards, public health officials, of private individuals dwelling in the neighbourhood, and of the ratepayer. The sewage from the city is partly deposited on these tracts, which are exposed for many hours twice in the day, and covered with shallow water for an equal space of time; in hot weather not merely does this sewage decompose, but huge quantities of the *Ulva latissima* collect, rot, and lie in malodorous heaps. At first bacterial treatment of the sewage was thought to offer the best solution of the problem; tanks were erected, and some £60,000 were spent; then sedimentation and destruction by copper sulphate of shellfish which furnished an anchorage to the ulva was advocated and another £60,000 spent; this was the plan prepared by the experts of the Royal Commission on Sewage Disposal. Now, however, this scheme is also to be brushed aside, and £100,000 is to be asked for to reclaim a huge tract of foreshore—over 700 acres—on the County Down side of the lough. The City Council and Harbour Commissioners have come to an agreement, and a bill is to be promoted. From a sanitary point of view the proposal would seem to furnish grounds for great hope; but the question is at once asked, Will it not simply transfer the old conditions lower down the lough? and what is to be done with the County Antrim side, where there are also large tracts of foreshore which are at times worse smelling than the County Down side? The public lose confidence in those who promote unfailing schemes that are tossed overboard in a few years, and financiers seem rather aghast at this piling on of burdens when both City and Harbour stock are so low and the future so uncertain.

## Scotland.

*[FROM OUR SPECIAL CORRESPONDENTS.]*

### Antivivisection Shops.

Two or three weeks ago a shop was taken in Shandwick Place and used for the purpose of an exhibition of the imaginary horrors of vivisection. The following protest was issued by Sir William Turner, the Principal, and a number of professors:

Certain antivivisection societies have, in London and elsewhere, adopted the method of renting shops in fashionable thoroughfares and displaying in the windows reproductions of animals or even stuffed animals, professing thereby to exhibit methods of torture which (according to the literature diffused by these societies) is perpetrated by medical men and physiologists upon dumb creatures. At the same time the truth is carefully concealed that an animal subjected to an operation is as completely anaesthetized as is a patient on a surgeon's operating table. The excuse is offered that the appliances displayed in these shops are actually supplied by the makers. But if the appliances used in hospitals were similarly displayed, with models of human beings fastened on them, the exhibition would be so grossly offensive to the public eye that the authorities would forbid it. In our opinion it is not really less offensive to display these travesties of operations upon animals, especially when we know that, by means of animal experimentation, knowledge has been gained (and could only have been thus gained) whereby a vast number of both human and animal lives have been saved and an incalculable amount of suffering has been alleviated. In this connexion we may quote the following from the report of the Royal Commission on Vivisection:

"To represent that animals in this country are wantonly tortured would, in our opinion, be absolutely false."

The occasion for this letter is the opening of a shop of this nature in one of our busy streets. Edinburgh has hitherto been free from the scandal of exhibitions of this kind, and we desire to protest against the establishment of one here as being both an outrage on public opinion and a slur on the memory of the many eminent men who, by their researches into the causation and treatment of disease, have raised the name of our city to so high a position in medical science.

The protest bears the following signatures: William Turner, Byrom Bramwell, Francis M. Caird, George A. Berry, J. Halliday Croom, Thomas R. Fraser, George A. Gibson, Harvey Littlejohn, James Ritchie, E. A. Schäfer, Alexander Russell Simpson, J. Lorrain Smith, Harold J. Stiles, H. Alexis Thomson, John Wyllie.

The exhibition was removed to Nicolson Street. On November 15th an attack was made by more than 500 students on the shop, which was wrecked. A free fight between the assailants and the police ensued. Several policemen and students were hurt and had to be taken to hospital. Ultimately, twenty-three students were arrested.

## India.

*[FROM OUR SPECIAL CORRESPONDENTS.]*

### The Pasteur Institute of India.

The report for the year 1911 has been drawn up by Major W. F. Harvey, I.M.S., and Captain H. W. Acton, I.M.S. The total number of persons treated in the institute was 2,268—1,971 Indians and 297 Europeans. Among these 43 deaths took place, 1.9 per cent. of treated. Of this number 14, or 0.6 per cent., were accounted failures. Only 1 death occurred among the Europeans treated. The disparity depends, according to the report, on a variety of circumstances favouring the European. Data are being collected in order to show the mortality among persons bitten at the same time but not treated. The financial position of the institute is sound. The income of the year was Rs. 69,949, and the expenditure Rs. 46,460. The investments amount to over a lakh of rupees. Useful additions have been made to the buildings. The institute performs, in addition to its proper function, a substantial amount of clinical and pathological research. Feeling reference is made to the death of Major G. Lamb, I.M.S., who, as director, took such a lively interest in the work of the institution, and devoted himself so sedulously and successfully to scientific investigation.

### The Countess of Dufferin's Fund.

The twenty-seventh annual report of the National Association for Supplying Female Medical Aid to the Women of India, compiled by the honorary secretary, Lieutenant-Colonel F. O'Kinealy, I.M.S., sets forth the transactions of the year 1911. It gives evidence of continued progress of this excellent movement. The institutions supported in whole or in part by the fund are, as is shown by a map prefixed to the report, scattered thickly throughout the whole of the Indian empire, including independent native States. Working under the general control of a central committee are 13 provincial branches and 140 local and district associations. There are 177 hospitals, wards, and dispensaries for the treatment of women, and the number of women and children treated in these in 1911 was 1,254,677. There are 56 fully qualified lady doctors employed by the fund, 92 assistant surgeons, and 342 hospital assistants, besides numerous nurses and midwives; 586 women are undergoing medical education, which is a prominent object of the fund. Lady doctors are settling in private practice in increasing numbers in populous centres. Discussions are taking place regarding the raising of the status and pay of lady doctors, and even creating a "Women's Indian Medical Service," and regarding giving qualified lady doctors in charge of hospitals a more independent position. The finances of the fund are equal to its present requirements; but private

subscriptions are meagre, and the provincial Governments are unable to give increased grants in support of the proposed alterations.

### St. John Ambulance Association.

The Indian branch of the St. John Ambulance Association was started in the year 1900, and during the first decade of its existence it has spread all over the Indian Empire. The report for the year ending September 30th, 1911, drawn up by the Honorary General Secretary, Major R. J. Blackham, R.A.M.C., Knight of Grace of the Order of St. John, indicates commendable activity and progress in teaching first aid, home nursing, and domestic hygiene to soldiers, police, railway men, students and scholars, mill employees, miners, and members of the general community. There are 10 provincial centres, 18 native state centres, 62 district centres, 8 railway centres, 3 town centres, and 8 others, making a total of 109 centres, in each of which the work of instruction and examination is keenly pursued. Indian officials and natives of position take an active interest in the proceedings, and medical officers lend willing aid in teaching and examining. The list of office-bearers, headed by His Majesty the King, is long and distinguished, and the catalogue of life members, which includes a great number of Indian nobles and gentlemen, is satisfactory, and will probably undergo increase as the objects and operations of the association become more generally known and appreciated.

## Hong Kong.

*[FROM OUR SPECIAL CORRESPONDENT.]*

### The Public Health.

The colony of Hong Kong consists of an island of that name, together with a certain amount of territory on the adjoining main land. Only an area of some 48 square miles is under the control of the Sanitary Board, and it is to this portion that relates the joint report for the year 1911 of the principal civil medical officer, Dr. Atkinson, and the medical officer of health, Dr. Clark. Its estimated population is a little under 374,000, of which 18,837 persons are non-Chinese. In both sections of the population there is an excess of adults; and over half the whole population are between the ages of 20 and 45. The old type of Chinese dwelling in which the non-European population dwells is gradually being replaced by premises erected in accordance with the Public Health Ordinance of 1903, and a certain improvement in the healthiness of the native quarters is thus being brought about. During the year under consideration, however, progress was in some respects discounted by an influx of refugees from the revolutionary area of Canton, and this led to a certain amount of overcrowding. The corrected birth-rate is given as 6.9, but this is a figure of little interest, owing partly to the deficiency of women in the population and partly to registration of births being not compulsory. The general death-rate was 20.74 per 1,000, this being made up of a death-rate of 21.13 per 1,000 amongst the Chinese, and of 13.38 per 1,000 amongst the non-Chinese sections of the population. Analysed still further, the death-rate for Europeans and other "whites" was 8.7, for East Indians 17.9, and for races classed as mixed and coloured 23.8. The deaths from phthisis among the Chinese were equal to 10 per cent. of the total deaths in that community, as compared with 10.3 in 1910 and 10.7 in 1909, and those from other forms of tuberculosis bring up the percentage to 15.7. Considerable efforts have been made during the past few years to put a stop to the habit among the lower classes of spitting in public places, and on footpaths, walls, etc. Notices have been posted in many public places, lectures have been given, and leaflets distributed, calling attention to the dangers of the habit. It is hoped that by these means, coupled with an improved sanitary condition of dwellings, the death-rate from phthisis, which is now so high, will be reduced. Plague accounted for 269 deaths, small-pox for 272, typhoid fever for 107, diphtheria for 36, puerperal fever for 7, cholera for 5, relapsing fever for 5, and scarlet fever for 1. Most of the plague deaths occurred in the No. 9 health district, which contains many old houses with basements and defective walls. Active antiplague measures are constantly maintained, the aims including the exclusion of rats from all dwellings and the collection of all dead rats, these being placed when found in bins containing a carbolic acid disinfectant. There are 650 of these bins distributed throughout the city and its suburbs, and each of them is visited twice daily, and the rats therein taken for examination to the Government bacteriologist. Before the onset of the regular plague season—namely, from March to July—special efforts are made to destroy rats in various ways; by poison, by traps, and by bird-lime boards. All native dwellings are systematically cleansed and washed out at least once in three months with a flea-killing mixture. The measures also include lectures and addresses in explanation to induce the native population to participate in antiplague work. Some 87,000 rats were caught or found dead during the year, and 269 of them were found to be plague-infected. The cases of typhoid fever are regarded as largely due to the eating of raw salads, grown in Chinese market gardens in which it is customary to water and manure plants with diluted human excreta. Hence residents in the Far East should carefully avoid such articles of food as watercress and lettuce. The incidence of typhoid is chiefly on Europeans. The mean temperature throughout the year was 72.1, the relative humidity being 79. As many as 90.55 inches of rain fell, the figures for May and August respectively being 22.145 and 30.060. The maximum temperature in any month was 87.0 (June), and the minimum temperature 55.5 (January).

## Special Correspondence.

### VIENNA.

*New Dissecting-Rooms for the Medical School at the University of Vienna.—New Regulations for Medical Service in the Austrian Mercantile Marine.—The Austrian Red Cross Society and the Balkan War.*

The lack of proper accommodation for students wishing to follow the anatomical classes, which was referred to in a previous letter (August 3rd, 1912), has caused a certain amount of ill-feeling in medical circles in Vienna, and has given rise to continual protests from the students, who feel that they are being unjustly defrauded of their rights. It was also the occasion of a most unusual decision on the part of the anatomical professors, which resulted in the granting of the "*numerus clausus*" for students of anatomy. It was the taking of this resolution by the professors that prompted the Board of Education (on which the responsibility for the existing state of things really rests) to grant funds for the erection of two new dissecting-rooms over the four already in existence. Unfortunately the new buildings, which will not be completed for another three months, are no larger than the old ones, and are therefore incapable of holding more than 125 students at a time. Since, therefore, in spite of the extra rooms, there will only be sufficient accommodation for 750 men, and there are over 1,500 applicants for admission to the anatomical lectures, it is not surprising that considerable indignation has been aroused by these half-hearted measures on the part of the board; and all those concerned have expressed the determination not to rest until Vienna possesses an anatomical institute worthy of her position in the front rank of science and medicine. The students are supported in this matter not only by their teachers, but by the whole profession and by the bulk of the public, who fully recognize the necessity for providing the future guardians of the public health with the means of obtaining a thorough knowledge of the science of anatomy.

New regulations concerning medical service in the Austrian Mercantile Marine have been issued recently by the Austrian Chamber of Commerce, in virtue of which every vessel trading under the Austrian flag or in Austrian ports is bound, if the number of her passengers exceeds 50 or the total number of persons on board over 100, to carry a fully qualified doctor on every voyage. Should the number of passengers exceed 300, or if the vessel carries, together with the crew, more than 500 persons, the ship's officers must include two doctors. Each vessel is bound to be provided with a properly equipped dispensary, where, if the occasion arises, a major operation

can be conveniently performed, and each doctor has the right to a private cabin for his own personal use. As regards fees, the third-class passengers and crew are entitled to gratuitous attendance and medicines, whilst the holders of first-class and second-class tickets are expected to pay the usual fees. These fees, by the way, are usually those customary at the port from which the vessel has sailed. As regards nursing, a female nurse is provided if the boat carries over 50 women passengers, two if the number exceeds 150, and so on. The doctor's salary is a matter of arangement between himself and his employers, but it is only fair to add that in the Austrian service this arrangement is usually by no means an unsatisfactory one.

Ever since the outbreak of hostilities in the Balkans the Austrian Red Cross Society, being the nearest of its kind to the seat of war, has dispatched numerous nursing and first-aid expeditions to every army in the field. As a rule, these parties consist of from four to eight surgeons (either the leading men from our big clinics or their assistants) and from ten to eighteen nurses, who carry with them everything that is necessary for operations and the dressing of wounds, Greece and Montenegro in particular being almost destitute of medical comforts. Reports have already reached us that the Red Cross volunteers are overwhelmed with work, for the losses amongst the combatants are enormous, and the medical and sanitary arrangements for the armies of the united kingdoms are hopelessly inadequate. It should be borne in mind that the Austrian branch of the Red Cross Society prepared to take the field at a moment's notice directly the trend of the political negotiations proved war to be imminent, and it was therefore the first to bring help to the Bulgarian and Montenegrin armies. As the number of wounded increases daily new relief expeditions are constantly leaving Austria, and these naturally constitute a severe strain on the resources of the society.

# Correspondence.

## THE URGENT NEED OF A STREET AMBULANCE SERVICE FOR LONDON.

SIR,—As a member of the London County Council, I have read with interest your leading article of November 9th and the excellent report of the debate in the Council of November 12th. I quite agree with the opinion expressed in your leading article, namely:

> It is idle for the County Council to endeavour to thrust its responsibility on to other authorities. No other local authority in London can attempt the work without being liable to be surcharged. It is the County Council's responsibility alone. . . . If the Home Office and the County Council would cordially co-operate, an adequate service might be in working order before the end of the year.

The Metropolitan Ambulance Act, 1909, is not an obstruction in the way, but the very instrument which enables immediate action to be taken. The public are indebted to Sir William Collins for his action and energy in the matter. It was only after the Home Office, on receiving the report of the Departmental Committee in 1909, declined to introduce legislation that Sir William Collins introduced his bill. When that bill was in Grand Committee in the Commons on August 17th, 1909, the question of the authority—whether the London County Council or the Asylums Board—was threshed out, and by 28 to 1 it was decided that the London County Council should be the ambulance authority for London.

Moreover, in the Lords, Earl Beauchamp, speaking for the Home Office, said:

> The position of the Home Office is this: There is an urgent need for the establishment of a good ambulance service in London; but, in the opinion of the Home Office, it would not be possible for the Metropolitan Asylums Board to undertake that duty now, and there is some fear that the public, at any rate, would imagine that the ambulance of the Metropolitan Asylums Board was liable to infection. . . . The London County Council would probably be able to use a certain amount of land and a certain number of stations, perhaps, and altogether, in the opinion of the Home Office, they are the proper authority to undertake the work.

Mr. (now Lord) Gladstone, the Home Secretary, also said:

> The Metropolitan Asylums Board was not constituted and was not specially designed as an administrative authority for the metropolitan area apart from the matters specially entrusted to it. Legislation would be required to do this, and he did not see the smallest chance of getting the House of Commons to accept such a body. That being so, the alternative proposal might involve dangerous delay, and all were agreed that this was a matter of urgency.

Thus the Home Office, which (most anomalously) is the police authority for the county of London, decided against the Asylums Board and for the County Council.

As you, Sir, say, "Not investigation, but action, is needed," not further parliamentary powers, with all the doubt and delay incident thereto, but the will and the small expenditure needful to put in force the beneficent powers already entrusted by Parliament to the County Council.—I am, etc.,

London, W., Nov. 18th. SAMUEL LITHGOW.

## THE SURGICAL TREATMENT OF RECTAL CANCER.

SIR,—I have read with much interest Mr. Harrison Cripps's paper on the above subject, which appeared in the JOURNAL of October 5th, and I much regret that I was unavoidably prevented from attending the meeting and taking part in the discussion.

I have also read the criticisms offered by my colleagues, Messrs. Mummery and Gordon Watson, on this paper in the JOURNAL of November 9th, and Mr. Cripps's reply in the JOURNAL of the following week. I must say that I am entirely in agreement with my colleagues in their praise of the sigmoidoscope as a means of diagnosing high-lying carcinoma—that is, cases which are situated beyond the reach of the finger. Mr. Cripps, in his reply, adheres to his original statement—namely, that the instrument "is worse than useless, being at times positively misleading. Cancer can never be diagnosed to a certainty by sight alone; touch only by indicating hardness and friability has to be relied upon." No doubt the sense of touch is the more important when distinguishing between a benign and malignant neoplasm of the rectum. But in early cases where the lesion is still small—perhaps not larger than a shilling and situated beyond the reach of the finger—the sigmoidoscope will reveal its presence, when a bimanual examination can then be carried out under anaesthesia to determine, or rather to confirm, its nature. Had the lesion not been seen through the sigmoidoscope, it is more than likely that its presence would have escaped notice by the bimanual method.

In advanced cases the sigmoidoscope is not necessary, as the neoplasm, whether in the upper rectum or pelvic colon, can be felt by the bimanual method. But these are usually the "too late" cases! It is the early cases it is so necessary to recognize, in order that, by an early removal, the patient may have the best chance of a complete and permanent cure. I could instance several cases from my own practice in which, thanks to this instrument, a small and unsuspected cancer has been seen either in the pelvic colon or at the recto-sigmoidal junction, in which a diagnosis by the bimanual method would have been uncertain, if not impossible. Several of these cases afterwards underwent operation with the best results.

I cannot understand Mr. Cripps's objection to the sigmoidoscope; for the disease having been located by its use, further methods of examination can then be employed. For my part, I find the sigmoidoscope as indispensable for rectal work as is the cystoscope in urinary surgery.

I quite agree with Mr. Cripps in his statement, "that an overwhelming percentage of cases are situated within 6 in. of the anus," for this will include cases situated at the recto-sigmoidal junction, which modern anatomists place at 5 in. from the anus. I must, however, differ from him in his opinion, namely, "that therefore they can be dealt with from below," for I have found that in most cases of cancer at the recto-sigmoidal junction, and involving the entire circumference of the bowel, it is impossible to get above the growth satisfactorily by a parasacral excision, and have had to open the abdomen in order to do so. I have therefore come to the conclusion that such cases are best dealt with by the combined operation.

I am glad to find myself in accord with Mr. Cripps when he says, "If the patch of disease is limited, only involving a portion of the circumference, it is a great advantage to remove the growth with a moderate margin free of disease and not the whole circumference of the bowel." I have had several of these cases of limited excisions where the growth has been confined to the posterior rectal wall and not larger than a shilling. They all did well and no recurrence has taken place, although the last was done over five years ago.

I fancy the real question now before the profession is: What is the best mothod of dealing with cases situated at the recto-sigmoidal junction or low down in the pelvic colon—cases which cannot be dealt with from above nor from below alone? For such cases four courses are open:

1. The combined operation, together with bringing the pelvic colon down to the anus.
2. The combined operation with a rectorrhaphy through a parasacral incision.
3. The combined operation with the formation of an abdominal anus and removal of pelvic colon and rectum.
4. Colostomy.

The first is the ideal operation, for the sphincter is preserved, and the patient subsequently has the use of the normal anus, but there is always the risk of some sloughing of the gut with resulting troubles.

In the second, excision of the coccyx, and probably part of the sacrum, increases the gravity of the operation. A stricture at the site of the anastomosis will form which requires treatment for some months by bougies, but the after-result is excellent.

In the third the patient is saddled with an artificial anus, but there is less chance of recurrence and more chance of recovery from the operation than in the other two.

As to colostomy, this should be reserved for all inoperable cases and for cases which, though operable, would be attended with too great a risk to life. Such is the case with males, and especially stout subjects. I believe that the combined operation in these is attended with a mortality of at least 50 per cent.

There is no doubt that women stand this operation far better than men; indeed, with them I have been uniformly successful.—I am, etc.,

London, W., Nov. 13th. F. Swinford Edwards.

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Sir,—I was interested to read in the Journal of November 9th Mr. Harrison Cripps's reply to my letter and that of Mr. Gordon Watson's. I do not think I have anything to add to my original statements, as Mr. Cripps has not brought forward any fresh arguments. There is, however, one little misunderstanding I should like to clear up. Mr. Cripps's figures are taken from cases in private practice only, and he assumes in his letter that mine include hospital cases; but, as a matter of fact, the figures I gave were taken entirely from my own private practice and excluded all hospital cases, so that they were exactly comparable with those of Mr. Cripps. The difference in the percentages for cases of high and low carcinoma cannot therefore be explained on the assumption that his were private cases and mine were not, and I think we must infer that the difference is to be accounted for by the earlier diagnosis rendered possible by the sigmoidoscope. Many cases of high carcinoma of the rectum, which are at first out of reach of the finger and only diagnosable by means of the sigmoidoscope, in course of time get pushed lower down into the bowel and become easily palpable. Earlier diagnosis, which alone is made possible by the sigmoidoscope, may therefore possibly account for the much larger percentage of high carcinoma of the rectum occurring among my cases than among those of Mr. Cripps.—I am, etc.,

London, W., Nov. 14th. J. P. Lockhart Mummery.

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Sir,—The correspondence which has appeared in the British Medical Journal of November 2nd, 9th, and 16th, as a result of Mr. Cripps's excellent paper in the Journal of October 5th, has interested me greatly. The early diagnosis of rectal cancer is of the utmost importance, and for this purpose the use of the sigmoidoscope in doubtful cases is indispensable. Indeed, I should say that a rectal examination cannot be considered to be absolutely complete unless such an endoscopy has been carried out. For this reason, I cannot agree with Mr. Cripps when he states that for the purpose of diagnosis the sigmoidoscope is "worse than useless, being at times positively misleading."

At the same time, I do not agree with Mr. Mummery that "cancer can be more certainly diagnosed by sight than by touch." Personally, I rely upon digital examination, and make use of the sigmoidoscope for the purpose of confirming the diagnosis, or to enable me to remove a portion of the suspected tissue for microscopical examination. The mere inspection of a neoplasm does not give much information in regard to consistency, mobility, and extent of possible permeation—points that are of much importance when arriving at a conclusion as to the nature of a growth and the prospects of a successful removal.

In regard to the height above the anus at which carcinoma of the rectum most commonly occurs, it must be remembered that, anatomically speaking, the rectum is only 4½ in. long, and therefore any growth involving the rectum is within easy reach of the finger. Growths implicating the terminal portion of the pelvic colon—that is, the portion extending from the left sacro-iliac synchondrosis to the middle of the third piece of the sacrum—can also, in most instances, be felt quite distinctly, and the presence of an early growth in this situation should not be missed by a careful digital exploration. When carcinoma attacks the pelvic colon at a higher level than this the growth is usually situated at or near the middle of the loop of the pelvic colon or at the commencement of the loop. In these situations the growth is entirely out of reach, and is often too small to be made out by bimanual examination, even under an anaesthetic, because it is of the circularly infiltrating or whipcord type which produces stenosis before any other symptoms signifying its presence are developed. In these cases the gradual onset of chronic intestinal obstruction is the symptom which brings the patient for relief, and laparotomy is the surest means of confirming the diagnosis. In such cases I have not found that the sigmoidoscope affords much information owing to the difficulty of introducing the instrument to the required level when the abdomen is considerably distended.

Mr. Mummery takes exception to Mr. Cripps's statement that "an overwhelming percentage of cases are situated within 6 in. of the anus, probably not 10 per cent. originating above this height." In a letter to the Journal of November 9th Mr. Cripps gives the percentage of his cases occurring within 6 in. of the anus as 86.4, and that of cases above the level of 6 in. as 13.7. I agree with Mr. Cripps's estimate, and in support of this I should like to draw attention to a collection of 59 specimens of cancer of the rectum and of the terminal portion of the pelvic colon which are in the museum of the Cancer Hospital. With three or four exceptions these specimens have been obtained from my operation cases, and can be seen by any one who may like to inspect them. The most striking point which this collection brings out is that there is not a single growth among the lot in which the lowermost border is at a greater height than 5 in. from the anal margin. The following table of the distances of the lowermost edges of the growths from the anal margin is interesting:

| Distance above Anal Margin. | No. of Cases. | Percentage. |
|---|---|---|
| Between anal margin and 1 in. above it ... | 30 | 50.8 |
| Between 1 and 2 in. above anus ... ... | 16 | 27.1 |
| Between 2 and 3 in. ,, ... ... | 6 | 10.1 |
| Between 3 and 4 in. ,, ... ... | 6 | 10.1 |
| Between 4 and 5 in. ,, ... ... | 1 | 1.6 |
| Between 5 and 6 in. ,, ... ... | 0 | 0 |

From this table it is apparent that only 7 of the 59 cases—that is, 11.8 per cent.—were above the level of 3 in. from the anus. The peritoneal reflection is approximately 3½ in. above the anal margin, and therefore, according to this evidence, only 11.8 per cent. of growths in the rectum and in the terminal portion of the pelvic colon occur above the level of the peritoneal reflection—statistics which differ considerably from Mr. Mummery's estimate that 63 per cent. of growths are situated above that level.—I am, etc.,

London, W., Nov. 18th. W. Ernest Miles.

## THE TREATMENT OF NEURASTHENIA.

Sir,—Many of us have been anxiously awaiting Dr. Haddon's reply to Dr. Branson's letter and some explanation of his own of October 14th. In my experience neurasthenia is undoubtedly in most cases a toxaemia (which in all probability is sometimes the result of improper food). The temporary relief of such cases is comparatively easily secured by several methods, of which perhaps spa treatment with its eliminatory action is the most efficient and therefore the most satisfactory. To cure, however, the underlying cause in each case must be eradicated, and this is a much more difficult and tedious business. A large number of us are in a position to keep their patients under their own personal supervision and to ensure obedience, if Dr. Haddon will only kindly enlighten us as to the dietetic and other details of his three-day cure. Most of us are, I am sure, more open to conversion than, as he gives to understand, are medical superintendents of asylums, and are anxiously awaiting Dr. Haddon's prescriptions to enable us to cure many thousands of victims who suffer in a greater or less degree. —I am, etc.,

Llandrindod Wells, Oct. 26th. G. Vigers Worthington.

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Sir,—I was much interested in Dr. Brooks's article of October 12th, as I have frequently observed that chronic *B. coli* infections of the urinary tract are usually accompanied by symptoms of neurasthenia, and that these symptoms disappear after the use of autogenous vaccines, even in those cases in which the urinary infection remains unrelieved. I asked myself a question similar to the one which Dr. Donald asks in your issue of October 26th.

> If we make a careful bacteriological examination of the urine in all cases of neurasthenia, shall we not frequently find a bacterial infection?

After a year's investigation I have come to the conclusion that a urinary infection is not common in neurasthenia, but it does not follow that absorption of faecal micro-organisms or their products from the bowel is not a frequent cause of neurasthenia, although the point is difficult to prove.

It is obvious that if the *B. coli communis* in the urinary tract may produce symptoms of a general toxaemia, there may be conditions under which this same constant inhabitant of the intestine may cause similar symptoms.

In the hope that absorption is followed by the development of specific agglutinins in the blood, I have in a fair number of cases of neurasthenia (some, it is true, with mucous colitis) isolated a number of bacteria from the faeces, made a vaccine of the one which agglutinated most readily with the patient's serum, and have already noted much improvement in each patient as the result of the administration of the vaccine.

Hitherto I have not encountered streptococci in the numbers mentioned by Dr. Brooks, and have not employed them in my vaccines.

If it is held that a coliform bacillus can be identified by fermentation tests, then my finding is that the responsible micro-organism may be one of several varieties of *B. coli*, and it follows as a practical drawback that a very laborious routine is necessary for the diagnosis and treatment of any particular case.

If, however, any of your readers have evidence of the efficacy of stock vaccines in such cases, it is possible that a simple and practicable method of treatment of neurasthenia on such lines might be discussed in your columns. —I am, etc.,

Birmingham, Oct. 26th. Leonard G. J. Mackey.

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## THE SCIENTIFIC ORGANIZATION OF PHYSICAL CULTURE IN ENGLAND.

Sir,—The science of gymnastics, which took shape and form in Sweden in the early part of the nineteenth century, seems to have reached Berlin in the early Forties, passed into Paris a few years later, and Dr. McLaren in the Fifties developed it in England. Himself a surgeon, he wrote the handbook of gymnastics for the army, and so gave gymnastics a scientific send-off. Why do trained medical men neglect the scientific study of physical training? Recently I saw some laymen appointed as superintendents of physical training. Why do we inside the medical profession not regularize the training and make it a truly scientific study carried on within our medical schools?

Until the past twenty years the social side of the student's life was little cared for. Clubs and gymnasiums for them were rarely found in our medical schools. To-day such side-shows are everywhere in evidence. But why is not the gymnasium definitely annexed to the physiological department of a medical school and a scientific medically trained teacher placed for physical instruction on the school staff?

A physical training demonstrator so appointed would regularly train the students who desired a course. The physiological action on the body would be observed. A mass of observations would be collected, and, finally, a certificate in physical training would evolve which would later on become a diploma. For army and navy medical competitions we should later on ask for a gymnastic certificate, and so take the young officers ready trained into the service.

Medical men so trained would gradually find their way into superintendents' appointments in important gymnasiums, and the physical training of the country would be based on possibly sounder lines. Anyway, a number of scientific men would be interested in it.

Medicine in its forward march must year by year annex new territories. The scientific physical training of the people is a field awaiting culture. Let us medical men scientifically cultivate it.—I am, etc.,

G. J. H. Evatt,
London, Oct. 27th. Surgeon-General.

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## VISION OF SCHOOL CHILDREN.

Sir,—I read Mr. Moxon's report on his work in the special department for London County Council school children suffering from defective vision, at the Royal London Ophthalmic Hospital, published in the Journal of October 19th last, with great interest, and as a colleague of Mr. Moxon's in that department, and having worked in the general refraction department at that hospital and elsewhere for the past seven years, and having consequently examined a very large number of school children, I can endorse his statements in every particular, and am in thorough agreement with his views and conclusions.

There are a few points I should like to draw attention to, in addition to, and in support of his conclusions:

The first and, in my opinion, most important is the prevalence of and increase in the number of cases of acquired myopia. Having worked so long in the refraction department of one hospital, I have had the opportunity of keeping a great many cases under observation for a number of years—a number of my cases which were a few years ago hypermetropic, as much as 3 D. or 4 D. in some instances, are now myopic. This I attribute very largely, if not entirely, to overwork, or injudiciously apportioned work; of this latter, sewing is the most fruitful source of eyestrain in very young children, leading to development of myopia. The children are encouraged to make very fine stitches, working often in a cramped position and in a bad light. Attention is drawn to this in many school inspection reports.

In the second annual report of the Ayrshire Secondary Education Committee for 1911 the medical officer lays particular stress upon this point, stating that sewing done by children at too early an age, and particularly fine stitching, is a most certain cause of eyestrain, leading to defective vision in after-years.

The school inspection reports for Forfarshire and Salop for 1911 contain similar remarks by the medical officers. In the school inspection report for Rutland (1911) the medical officer notes that little children under 4 years of age are made to do what is termed "back stitching," and that this is most detrimental to their eyesight. The needlework inspector has been obliged to revise the scheme of work for these little ones. For some years I had been noticing an increase in the number of cases of former hypermetropes which had become myopic, but I think of late there is a slight change for the better, now that school inspection and treatment has been put on a sounder footing. But much still remains to be done.

As Mr. Moxon points out, $\frac{6}{6}$ is not an unreasonably high standard. Most normal-sighted children can read $\frac{6}{5}$, and,

as is well known, many myopes have a high degree of visual acuity with correction. One of my own private cases, a young fellow of 19, could almost read $\frac{6}{4}$ with his full correction. I consider that every child that fails to read $\frac{6}{6}$ should be noted for examination by an ophthalmic surgeon. Of course children sometimes fail through nervousness, but this can generally be recognized with a little care and patience.

A class of case that is often overlooked is the high hypermetrope with good distant vision. Many such children who are very backward are often considered stupid or lazy, until it occurs to some one to have their eyes examined. On being fitted with suitable glasses, the result is often surprising, the whilom dunce becoming a bright and intelligent scholar.

I quite agree with Mr. Moxon as to the advisability of inspecting medical officers being supplied with notes of some kind, as to the cases of children who have been under treatment, to avoid their being sent back unnecessarily. Teachers should be instructed not to send cases back unless there is obvious deterioration in their vision, or obvious disease of the eyes. I suppose it happens to all of us to have cases referred back, and find that they are those that we were particularly satisfied with—for example, cases of high mixed astigmatism with between $\frac{6}{12}$ and $\frac{6}{9}$ vision. Some teachers appear to believe that any eye can be made to see $\frac{6}{6}$ with the correct glass. Some system by which the inspecting medical officer could be supplied with a brief note as to the character of the case—as, for example, "A. B., aged 12; high mixed astigmatism; vision $\frac{6}{12}$, satisfactory"—would save much needless travelling on the part of parent and child.

I should judge, from what I hear, that many teachers are anything but discriminating as to the capacity of their pupils for work. Recently I was consulted at the hospital by a mother, as to the advisability of her daughter doing home work. The case was one of low myopic astigmatism, which did not in any way suggest progressive myopia; the child had recently had a nervous breakdown, and the myopia had increased over 1D. in less than nine months. Comment is needless.

In the case of a number of school children written instructions are necessary to ensure their proper treatment by the teachers, but to do this in every case where it is necessary would add enormously to the surgeon's work, and be impossible on occasions, when one has to see between thirty and forty children in a morning, as happens when a number of cases come up for re-examination or inspection. In all the more important cases I endeavour, whenever possible, to give written instructions. Verbal instructions are, I fear, overlooked or ignored.

I make a point of seeing all young myopes once a year, and, of course, cases of progressive myopia more frequently. All cases of high astigmatism in which the vision does not come up to a satisfactory standard at the time of examination I order to report after three or four months, and it is often most gratifying to find that vision has improved to a surprising degree with constant wear of suitable glasses. Not very long ago I saw about half a dozen such cases in which vision had come up to little short of $\frac{6}{6}$, from less than $\frac{6}{12}$, after constantly wearing glasses for three or four months. In such cases I give instructions that as long as the glasses are comfortable, and fit, they need not report again. It seems to me unnecessary that such children should come up once a year as a matter of routine. If vision drops at all, or the frames get tight and uncomfortable, then they should report. I find that, as a rule, the better-class parents, who take an intelligent interest in the welfare of their children, are glad to carry out the doctor's instructions, and bring them up for inspection or re-examination, as directed, quite apart from any instructions on the part of the school authorities.—I am, etc.,

GEO. T. MOULD,
Chief Clinical Assistant, Royal London Ophthalmic Hospital (Moorfields).

London, W., Nov. 10th.

## SEASICKNESS.

SIR,—In the BRITISH MEDICAL JOURNAL of November 16th you give an excellent notice under the heading of "Seasickness" of Dr. O'Byrne's very useful treatise. I have read this work with very great interest, as I have been collecting facts and data, having regard to this distressing ailment, since the year 1883. The advice given in this book is very good indeed; but, unfortunately, the sea-going public rarely reads medical literature, and I fear that unless it is possible to have Dr. O'Byrne's methods thoroughly taught at established schools, very few people will know about his very excellent advice. As a seasick sailor, with years of experience, I have found that those who suffer from this fell trouble look for some easy mode of procedure to recovery, and some sufficient remedy which will be easy to swallow. I have myself tried posturing; I have attempted to divert the attention to some other subject; I have bandaged myself, and endeavoured exercising will power to conquer my foe. But all in vain—

Mein Magen knurrt.

My sense of dignity has been lost; and with a green and troubled countenance I have paid tribute to the ocean. Fortunately, now I can enjoy a sea voyage, for I have found a simple, safe, and agreeable remedy in a combination of menthol and valerianic acid, which you in your columns both this and last year have commented on favourably as a remedy for seasickness, under the name of validol.—I am, etc.,

T. MAILLER KENDALL.

London, E.C., Nov. 18th.

## THE ROYAL SOCIETY OF MEDICINE AND THE SOCIETY OF TROPICAL MEDICINE AND HYGIENE.

SIR,—Considerable misconception as to the relations existing between the Royal Society of Medicine and the Society of Tropical Medicine and Hygiene appears to have originated as a result of some recent negotiations. For various reasons the council of the latter society has decided that amalgamation is at present impracticable, and that in the meantime the Society of Tropical Medicine and Hygiene must continue to exist as an independent body, but workers in tropical medicine all over the world fully recognize—none more readily—the services which the Royal Society of Medicine has rendered to the profession, and the advantages which accrue from access to its magnificent library, to its wealth of current Continental, American, and British literature, and to the help in research which is so readily rendered by an exceptionally qualified staff of librarians. Further, the desire of the Royal Society of Medicine to represent and embody in its constitution every branch of medicine has their natural sympathy, and when it can be shown that there is scope and opportunity for a Section of Tropical Medicine, their support will doubtless be freely accorded. Friction or inharmonious rivalry between the societies is inconceivable.—I am, etc.,

W. CARNEGIE BROWN.

London, N.W., Nov. 11th.

## DIPLOMAS AND DEGREES.

SIR,—I was very surprised on reading some of the remarks made by "Hall and Royal Colleges" in his letter under the above heading, which appeared in the BRITISH MEDICAL JOURNAL of October 26th. He states that "medical authorities of the day seem to consider that it is an undisputed fact that a man with any university degree must be superior to one possessing that of the Royal Colleges." This statement is not borne out by the attitude of the "medical authorities" to-day.

The majority of house appointments at the big London hospitals are held by men with the M.R.C.S., L.R.C.P. diplomas, often in preference to men holding degrees. One of the highest authorities in the matter of making these house appointments told me that, with the exception of the Universities of Oxford, Cambridge, and London, no university degree has precedence to the M.R.C.S.Eng., L.R.C.P.Lond. And bearing in mind the unrivalled field of clinical experience men educated in London have at their disposal, I think it only reasonable to assume that the average man holding the diplomas of English Royal Colleges is quite as capable, well trained, and efficient a member of our great profession as one holding an M.B. degree.

Surely there has been too much nonsense written about the difference between degrees and diplomas. It is only fair to let a man's work speak for itself, and I venture to

say it will then be found that the difference in the majority of cases does not exist.

I feel sure that many men who, like myself, hold the M.R.C.S.Eng., L.R.C.P.Lond., are more proud of it than if they held the M.B. degree of one of the smaller universities.—I am, etc.,

October 27th. HOUSE-PHYSICIAN, M.R.C.S., L.R.C.P.

## ANTIVIVISECTION IN GLASGOW.

SIR,—Under the above heading you draw attention in a leading article to an address I recently delivered at St. Andrew's Hall, Glasgow, and make special reference to a quotation I gave from Sir Frederick Treves, which was published in your JOURNAL on November 5th, 1898. You remind your readers of the fact that Sir Frederick Treves has protested against the use made of his utterance, and you accuse me of either disingenuousness or of failure to make proper inquiry into the facts.

I plead guilty to neither charge. I have quoted Sir Frederick Treves fairly and squarely, and I repudiate his subsequent assertion that improper use has been made of his statement. I am unaware that he has shown in any single instance where I or any of my antivivisectionist friends have been guilty of the charge he makes against us. Allow me to quote what he said and what I repeated in Glasgow:

> Many years ago I carried out on the Continent sundry operations upon intestines of dogs, but such are the differences between the human and the canine bowel, that when I came to operate on man I found I was much hampered by my new experience, that I had everything to unlearn, and that my experiments had done little but unfit me to deal with the human intestine.

You refer to his protest in the *Times* of April, 1902. Well, here is what he said on that occasion:

> My solitary utterance on the subject of vivisection is contained in an address delivered at Birmingham in October, 1898. Speaking of suturing of intestine, I said that I had found that operations upon the intestines of dogs were useless as a means of fitting the surgeon for operations on the human bowel.

Pray, where have I misrepresented him? The remainder of your criticism embraces a fair report of what took place at my meeting in Glasgow, and calls for no further comment from me.—I am, etc.,

WALTER R. HADWEN, M.D., J.P.,
President, British Union for the Abolition of Vivisection.

Gloucester, Nov. 18th.

*** Dr. Hadwen uses a passage isolated from its context to convey an implication which Sir Frederick Treves has more than once strongly repudiated. If this is not misrepresentation, we are at a loss for an appropriate term. Perhaps it may be found in what Tennyson's parson said:

> That a lie which is all a lie may be met and fought with outright,
> But a lie which is part a truth is a harder matter to fight.

## ANAESTHETICS IN EXPERIMENTS ON ANIMALS.

SIR,—Dr. Pembrey has written to you to say that the Royal Commission are wrong in conveying the impression that he regarded the frequent use of anaesthetics as unnecessary in experiments on animals.

Dr. Pembrey must have forgotten what he said in his evidence. Here are some of his statements:

> I admit I have done painful experiments, and I am not ashamed of admitting it. They are absolutely necessary.—Q. 14,084.

Again:

> Q. 14,090. . . . I think we ought to be given a licence to cover all experiments. I think that the Act is entirely antagonistic to the advancement of physiology. If we were given a licence for all experiments there would be no more cruelty. There would be a great saving of time and no limitation of work, and there would actually be in the long run a saving of life.
>
> Q. 14,091. What do you mean by a licence for all experiments?—I mean without any conditions.
>
> Q. 14,092. With or without anaesthetics?—Yes, without any limitation at all, and without certificates.
>
> Q. 14,093. That is to say, you are to put yourselves in the condition in this country which, I understand, physiologists are in in some parts of Germany, where there is no limit?—I think there should be no limit; that is to say, that a recognized physiologist should be given a licence to cover all experiments.

Dr. Pembrey is, of course, entitled to hold and express these views, but he is not entitled, when he discovers that they are unpopular, to say that he is misrepresented by those who condemn them.—I am, etc.,

London, S.W., Nov. 18th. STEPHEN COLERIDGE.

# Universities and Colleges.

## ROYAL COLLEGE OF SURGEONS OF ENGLAND.

AN ordinary council was held on November 14th, Sir Rickman J. Godlee, Bart., President, in the chair.

*Issue of Diplomas.*

Diplomas of membership were granted to eighty-nine candidates found qualified at the recent examinations.

Diplomas of the Licence in Dental Surgery were granted to five candidates found qualified.

*National Health Insurance.*

At the council meeting held on October 10th, a letter was read from the National Health Insurance Commissioners (England) stating that the question whether resident medical officers and other qualified resident officials at a hospital are employed by the hospital authorities under a contract of service has been submitted to them for a formal decision under Section 66 of the Act, and that a hearing of persons interested in the application will take place on Tuesday, October 22nd, at 2.30 p.m., at the Civil Service Commission, Burlington Gardens, and asking, if any representatives of the Royal College of Surgeons of England propose to attend the hearing, to be furnished with not less than three days' notice of the intention of such representatives to be present, statements in writing being admissible up to the day preceding that fixed for the hearing.

The following answer was returned to the above by the President, who was authorized by the Council to undertake this after the conference to be held at the Royal College of Physicians on November 15th:

"The Council of the Royal College of Surgeons has not had the matter referred to in your letter of the 3rd inst. under formal consideration, and do not propose to avail themselves of the opportunity afforded them of sending representatives to give evidence before your committee.

"In acknowledging your letter I may, however, point out:

"(*a*) That resident medical officers in hospitals naturally fall into two classes: First, those who receive small salaries or merely board and lodging, not because their services are not worth more, but because they discharge their duties for small payment in consideration of the advantage they gain from the instruction they receive in doing so; and, secondly, those who hold more or less permanent appointments and whose salaries exceed the income tax limit. Neither of these classes, therefore, appear to be employed persons under the meaning of the Act.

"(*b*) That, in the case of sickness, it is the invariable custom for such officers to be offered treatment in the hospital to which they are attached, an offer which is, in most cases, taken advantage of. It does not appear to be equitable to exact payment from both parties for that which is voluntarily given by one and for which the other has to pay nothing.

"(*c*) It is practically certain that none of those who receive low salaries, and could, therefore, conceivably be held to be insurable under the Act, would continue such insurance after the completion of their short term of office. The result of including them would therefore be that the hospitals would have to pay a perpetual tax in proportion to the number of these officers, who in their turn would have to pay for a few months for what under no circumstances could benefit them.

"It must not be forgotten that resident medical officers are most unlikely to join approved societies, and at the best, therefore, would only be deposit contributors."

*Bradshaw Lecture.*

The Bradshaw Lecture will be delivered by Mr. C. Mansell Moullin on Thursday, December 5th, at 5 p.m., the subject being "The Biology of Tumours."

*The Schiff Home of Recovery.*

Mr. G. H. Makins was nominated as a member of the Committee of Management of the Schiff Home of Recovery.

## ROYAL COLLEGE OF SURGEONS IN IRELAND.

THE Carmichael Prize for the best essay on the state of the medical profession in Great Britain and Ireland has been awarded by the Council to Mr. Nelson Hardy, F.R.C.S.Edin.

## CONJOINT BOARD IN IRELAND.

THE following candidates have been approved at the examination indicated:

D.P.H. (BOTH PARTS).—D. Adams, J. M. Bennett, *L. Bousfield, Captain, R.A.M.C., J. Burke, W. H. Date, M. Golding, Alice W. Maclean, A. E. S. Martin, A. S. Millar, W. M. Morison, and R. M. Wishart.

* With honours.

### CONJOINT BOARD IN ENGLAND.

AT a meeting of the Comitia of the Royal College of Physicians on October 31st and of the Council of the Royal College of Surgeons on November 14th, diplomas of L.R.C.P. and M.R.C.S. were respectively conferred upon the following candidates:

A. Ashmore, E. Bach, *N. K. Bal, H. R. Bastard, G. E. Beaumont, P. L. T. Bennett, G. G. Bourdillon, R. St. L. Brockman, R. G. Brown, E. N. Butler, L. T. Challenor, P. C. Cole, L. G. Crossmann, K. F. R. Davison, A. E. L Devonald, G. R. Dobrashian, S. Doraisamy, F. N. Doubleday, F. P. Duncan, W. J. I. Dwyer, T. L. Ellis, M. S. Esler, B. C. Ewens, E. G. Fisher, W. B. Foley, W. K. Fry, V. Gabriel, G. E. Genge-Andrews, D. M. Gibson, †E. A. M J. Goldie, R. S. Graham, J. Greene, M. J. Haffey, D. B I. Hallett, W. J. Hart, H. Harvey, H. J. B. Heelas, C. Helm, H. J. Hoby, R. L. Horton, D. E. J. S. Hughes, A. Jackson, E. B. Jardine, D. D. B. Jay, H. W. Jones, R. A. Jones, S. Keith, C. Kennedy, W. J. T. Kimber, G. A. M. Leopold, T. P. Lewis, J. B. Lowe, W. C. D. Maile, *C. C. Marshall, L. A. Martin, G. O. Maw, *J. N. Mehta, N. M. Mehta, R. H. Miller, G. W. Mitchell, S. G. Papadopoulos, S. G. Platts, E. G. Reeve, W. R. Reynell, J. F. G. Richards, I. Ridge-Jones, G. H. Roberts, W. Robinson, H. C. Rook, G. A. Russell, C. M. Ryley, *J. G. Saner, R. Saravanamuttu, F. R. Scott, A. S Seabrooke, H. N. Sealy, W. J. D. Smyth, L. B. Stringer, A. L. Sutcliffe, W. F. Thompson, H. E. Thorn, *W. C. Toll, D. B. Truman, C. R. B. von Braun, J. R. Waddy, G. A. Walker, H Walker, *J. F. Ward. M. H. Watney, W. G. Watson, W. L. Webb, H. N. Webber, *G. J. Whetham, A. Wilson, E. Wordley, A. M. Zamora,

*M.R.C.S diploma already conferred.
†L.R.C.P. diploma not yet granted.

# The Services.

IT has been decided by the Government of India that officers in the bacteriological department are eligible for promotion to the administrative grade, and that on appointment to the department they are on probation for eight months.

# Medico-Ethical.

*The advice given in this column for the assistance of members is based on medico-ethical principles generally recognized by the profession, but must not be taken as representing direct findings of the Central Ethical Committee, except when so stated.*

C. B. K.—Our correspondent's request that he should be afforded every reasonable opportunity of getting to know all the patients in the practice in which he is a partner is only reasonable, but he does not say that there was any stipulation to this effect in the partnership agreement. It is conceivable that there might be differences of opinion as to what should be considered "reasonable opportunity"; for example, when A. goes away for his holiday B. ought certainly to be allowed to act as his locumtenent, and on all occasions when A. is unable to attend his patients B. should act for him. If A. allows these opportunities, on what other occasions does B. claim to be permitted to see A.'s patients?

# Obituary.

## DAVID MENZIES, M.D., F.R.C.S.E.,

EDINBURGH.

EDINBURGH has lost a striking and delightful personality by the death of Dr. David Menzies. He had been suffering for nearly a year from cardiac disease, aggravated, if not brought on, by excessive devotion to his work; though he entirely appreciated its serious nature, the end came rather unexpectedly on November 8th. An Edinburgh man by birth, Dr. Menzies received his professional education at the medical school of the university, and became M.B., C.M. in 1876 and F.R.C.S.Edin. some three years later. After the death of his father he succeeded to a large practice, which eventually he greatly increased. Giving up his entire time and attention to the work of his profession, he built up an enormous practice, which up till the very last he kept together by constant, untiring labour. He had an exceptionally large amount of obstetric work, and in this department he was specially expert. Few men enjoyed to a greater extent than did Dr. Menzies the affectionate regard of his patients, and by his urbanity, courtesy, and kindly disposition he made himself a universal favourite in the profession. It is impossible to conceive that Dr. Menzies had an enemy either among the public or in the profession. Notwithstanding the exacting duties of a large and widely scattered practice which absorbed his time, he made opportunity for frequently attending the meetings of the various societies in Edinburgh. His strenuous life permitted but few holidays, but nobody enjoyed a fishing holiday more than did David Menzies, and whether at work or play he was a genial companion.

In private life he was a man of singular charm and modesty, and adorned his profession by his upright personal character. His life was guided by the highest standards, and he has gone from us wearing the white flower of a blameless life.

### THE LATE DR. ARTHUR H. BENSON.

DR. JOHN B. STORY (Dublin) writes: The obituary notice of my late friend and colleague, Dr. Arthur H. Benson, in the JOURNAL of November 16th, p. 1424, requires amendment in the following particulars: The first hospital appointment obtained by Dr. Benson was on the staff of St. Mark's Ophthalmic Hospital in 1880, after his return from study on the Continent. The Royal Victoria Eye and Ear Hospital was formed in 1904 by an amalgamation of St. Mark's Ophthalmic Hospital and the National Eye and Ear Infirmary. The Throat and Ear Hospital had no part or lot in this amalgamation. Dr. Benson and the other members of the staff of the two hospitals became surgeons to the Royal Victoria Eye and Ear Hospital on the amalgamation. He was an original member of the Ophthalmological Society of the United Kingdom.

A VERY senior representative of the medical profession in Bath passed away in October, in the person of Dr. ALBERT COPPINGER, who, though he had retired from practice some six or seven years ago, still had many warm friends among his colleagues, and consequently will be much missed. Dr. Coppinger, a son of a captain in the Royal Navy, belonged to the Irish branch of a very old Suffolk family, and received his medical education partly in Dublin, partly in Paris, partly in Edinburgh, becoming a Licentiate of the Royal Colleges of the latter city in 1865. On leaving Edinburgh he spent some time in travelling. His experiences at this time included charge of an emigrant ship, on which occurred a severe outbreak of cholera, and he grappled with the situation so successfully as to win official recognition of the courage and ability displayed by him. Later on he became resident medical officer of the Royal Mineral Water Hospital at Bath, and after some ten years in that office commenced private practice, and carried it on until the date of his retirement. He was an early member of the British Medical Association, and maintained his interest in its proceedings both on its scientific and medico-political sides to the end of his life, despite the fact that during the last three months he was a constant sufferer. As a practitioner Dr. Coppinger was especially successful in dealing with children, while the esteem he enjoyed in professional and general circles was partly due to his possession of a highly cultured intellect, partly to his ready sympathy with his fellows both in their joys and in their sorrows. Besides being an admirable French scholar, he had considerable knowledge of art and natural history, especially in relation to the habits and breeds of various birds. He also had a good knowledge of the work of engravers, and had got together an excellent collection of engravings and of books. Dr. Coppinger, who was a member of the Roman Catholic Church, is survived by his wife, a daughter of the late Mr. Thomas Pavitt, of Flint House, Leatherhead. On her decease Dr. Coppinger's estate is to be divided between six charities, one of which is the British Medical Benevolent Fund.

WE regret to have to announce the death of Dr. GEORGE TAYLOR GUILD, of Dundee, on November 15th. He was the son of the late Mr. Guild, a well-known landed proprietor in Fife. He was born in 1868, and was educated at the University of Edinburgh, where he graduated M.B., C.M. in 1891. Early in his medical student days he decided to specialise in ear, throat, and nose diseases, and, besides devoting himself particularly to these branches of medical science at Edinburgh, he more fully equipped himself by further studies in Vienna and London. Some fifteen years ago he began his professional career in Dundee, and his ability was quickly recognized, not only in the city but in the surrounding counties. He was surgeon in the ear, throat, and nose department of the Dundee Royal Infirmary, and was lecturer in the

University of St. Andrews. For a number of years he was connected with the volunteer movement as an officer in the Artillery; he was fond of country life, an excellent shot, and a sound golfer. Dr. Guild is survived by a widow and two children.

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Deaths in the Profession Abroad.—Among the members of the medical profession in foreign countries who have recently died are Dr. Oskar von Diruf, who attended Prince Bismarck as physician on the frequent occasions the great statesman took the "*kur*" at Kissingen, aged 88; Professor Hans Strehl, lecturer on surgery in the University of Königsberg, aged 40; Professor Löbker, for the last twelve years President of the German Medical Association, formerly lecturer on surgery in the University of Griefswald, and well known as a sanitarian, aged 58; Dr. E. Tavel, extraordinary professor of surgery in the University of Bern, aged 55; Dr. Oswald Kohts, emeritus professor of internal medicine in the University of Strassburg, aged 68; Dr. L. E. Golubinin, extraordinary professor of internal medicine in the University of Moscow; Dr. E. Heuss, lecturer on dermatology at Zürich; Dr. U. A. Demiskij, of Astrachan, who worked as bacteriologist in the Steppe region and accidentally infected himself with plague, aged 48; Dr. Paul Segond, professor of clinical surgery in the Paris Medical Faculty, and senior surgeon to the Salpêtrière, aged 62; Dr. Henri Dor, of Lyons, formerly professor of ophthalmology in the University of Berne; and Dr. G. M. Tuttle, of New York, formerly professor of gynaecology at Columbia University, and one of the collaborators in the *American Textbook of Gynaecology*, aged 56.

# Public Health
## AND
# POOR LAW MEDICAL SERVICES.

### REPORTS OF MEDICAL OFFICERS OF HEALTH.

*Southport County Borough.*—The medical officer of health (Dr. J. J. Weaver) estimates the population of Southport at the middle of 1911 at 51,740. The net birth-rate for the year was 15.6 per 1,000 of the population, the death-rate 13.6 per 1,000, and the infant mortality-rate equal to 113 per 1,000 births. For some years the birth-rate of Southport has been low when given as a proportion of the total population, but it would be interesting to know whether it is really lower than the rest of England and Wales if stated as a proportion of the number of women at child-bearing ages. Dr. Weaver states that Southport is the first town in the United Kingdom to obtain a by-law against spitting on public footpaths; it has been in force in the borough since August, 1911. At one time serious complaints were made by residents and visitors alike of the offensive smells coming from sewer manholes in some of the principal streets. Eventually it was decided to close up all these openings and to instal Webb's sewer ventilating lamps. For the past seven or eight years they appear to have acted well, and few if any complaints are now made. Coincidently with the erection of the lamps there has been a marked decrease in the number of cases of typhoid fever in the town. During the ten years ending 1903 the average yearly number of cases notified was 36, and the deaths averaged 10. In the past eight years the notifications have averaged 7, and the deaths 1, per annum. The housing of the working classes is a serious problem in Southport, due in large measure to the high ground rents which are charged. On houses let at a rental of £22 per annum a ground rent of £3 per annum is charged. Many workpeople earning from 18s. to 24s. a week have to pay weekly rentals of 6s. to 9s. The whole question, Dr. Weaver asserts, is a serious one, and should engage the attention of the local authority, for, if nothing is done, not only will the working classes suffer and their position probably become worse, but the sanitary condition of the whole town, upon which its reputation depends, will be jeopardised. The Corporation will be well advised to give effect to the advice of its medical officer of health.

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Dr. George Whiteside Robertson, of Edinburgh, has been awarded the medal of the Order of St. John of Jerusalem in England, in recognition of the conspicuous heroism and self-sacrifice he displayed after a railway accident in South Africa last year. The train in which he was a passenger ran over a steep embankment in the middle of the night at a spot many miles from assistance. Dr. Robertson, who sustained serious injuries, including four broken ribs, had himself carried round among the passengers, and rendered valuable service by directing the treatment of the most seriously injured until he collapsed through pain and exhaustion.

# Medical News.

The Duke of Northumberland has been elected Chancellor of the University of Durham in succession to Dean Kitchin.

The fifth annual meeting of the Army and Navy Male Nurses' Co-operation will be held at St. James's Theatre, St. James's, S.W., on December 10th. H.R.H. Princess Christian will take the chair at 3 p.m.

The annual dinner of the Royal Free Hospital and School of Medicine for Women will be held at the Trocadéro Restaurant, Piccadilly, on December 11th, when Mr. Stanley Boyd will take the chair.

The students' annual dinner of the National Dental Hospital will be held at the Trocadero Restaurant, Piccadilly Circus, on November 29th, when Sir John Rose Bradford, K.C.M.G., will take the chair.

The meeting of the Hunterian Society at the London Institute, Finsbury Circus, at 9 p.m., next Wednesday, is to take the form of a lantern demonstration of diseases of the eye by Dr. W. M. Ettles. All members of the medical profession are invited to attend.

At the meeting of the Sociological Society to be held in the rooms of the Royal Asiatic Society, 22, Albemarle Street, W., on November 26th, Miss B. L. Hutchings will read a paper on fatigue and efficiency. The Hon. Sir William Mather will take the chair at 5.15 p.m.

A bill is shortly to be introduced into the Reichstag to provide against the baneful effects of faulty infants' feeding-bottles. The bill contains paragraphs according to which bottles with tubes either of rubber or glass may not be manufactured, or sold, or offered for sale, or imported, or exported. The penalty for infringement of the law are either imprisonment or a fine not exceeding £15 and the confiscation of the articles condemned.

The annual dinner of the Harveian Society of London was held at the Hotel Great Central on Thursday, November 14th, the President, Dr. H. Macevoy, in the chair. After the usual loyal toasts the President proposed the health of the Harveian Society, and Mr. D'Arcy Power proposed "The Kindred Societies," which was responded to by Mr. A. H. Tubby, President of the Hunterian Society. The toast of "The President" was proposed by Dr. Willcox, and Dr. Macevoy, in his reply, said he wished to acknowledge the assistance he had received from the secretaries, Dr. Carmalt Jones and Dr. Turtle, and proposed their healths.

The National Association for the Prevention of Infant Mortality and for the Welfare of Infancy was formed in July, 1912, by the federation of the National Conference on Infantile Mortality, of the Department of the National League for Physical Education and Improvement, the Association of Infant Consultations and Schools for Mothers, and the Women's National Health Association of Ireland. The association has now arranged a post-graduate course on the feeding and care of infants with special reference to milk. The course will be given partly at the Marylebone General Dispensary, partly at the Lister Institute, and partly at Guy's Hospital. Among the lecturers are, at the dispensary, Drs. Still, Eric Pritchard, and Professor Kenwood; at the Lister Institute, Professor Harden and Dr. J. Arkwright; and at Guy's Hospital, Dr. H. Cameron. The fee for the course, which will be held from January 6th to 16th, 1913, is one guinea. Further particulars can be obtained from Dr. Janet E. Lane-Claypon, 18, Craven Terrace, Lancaster Gate, W.

At the first formal meeting of the obstetrical society for the Midlands, which was brought into existence at Birmingham towards the end of last winter, it was resolved to substitute "Midland Obstetrical and Gynaecological Society" for the much longer title originally proposed. It was also arranged that the subscription should be 5s. annually, and that the dates of meetings should be the first Tuesday in the months of October, December, January, March, and April, the towns at which they should be held for the current session being Birmingham, Bristol, Cardiff, and Leicester. Subsequently the first president of the society, Professor Edward Malins, delivered an inaugural address dealing with the progress of obstetrics and gynaecology during the past twenty-five years. In its course he advocated the establishment of homes under direct or indirect public control solely for maternity purposes, and so arranged as to be suitable for the use on graduated payments of women belonging to all classes. The honorary secretary of the society is Dr. Beckwith Whitehouse, 52, Newhall Street, Birmingham.

# Letters, Notes, and Answers.

## QUERIES.

T. asks whether unpleasant symptoms have been observed after prolonged administration of helmitol.

SILVER asks whether injections of nitrate of silver to the prostatic urethra has ever been known to cause such a haemorrhage as to necessitate an external urethrotomy.

DR. GEORGE E. NESBITT writes: I shall be much obliged if you or any reader could give me any information relative to "William Sheridan, Hibernus, M.D., 1803." The name is found in this form in Addison's *Roll of Graduates of Glasgow University*. The man is known to have been alive in 1828. Information is sought as to where he practised, when and where he died, etc.

## ANSWERS.

DR. RICHARD PURDON.—The publications of the Eugenics Education Society, which include Sir Francis Galton's *Essays in Eugenics*, would probably meet the requirements of our correspondent. The address of the society is 6, York Buildings, Adelphi, London, W.C.

W. M.—H. G. Fiedler and F. E. Sandbach's *First German for Science Readers* (Alexander Moring Ltd., De la More Printing Press, 32, George Street, Hanover Square, W.) would, we think, meet our correspondent's requirements. Besides an outline of grammar, it comprises a useful Reader. The *Muenchener medizinische Wochenschrift* (J. F. Lehmann, Paul Heysestrasse 26, München), the *Berliner klinische Wochenschrift* (August Hirschwald, Verlagsbuchhandlung, Berlin), and the *Deutsche medizinische Wochenschrift* (Georg Thieme, Rabensteinplatz 2, Leipzig) are weekly periodicals of the highest standing.

F. X.—*Words to Wives on Pregnancy and Parturition*, by S. Bingham, M.R.C.S. (London: George Allen and Co., 1912, 3s. 6d.), will probably answer our correspondent's first question. With regard to the second, the following books might form the nucleus of a reference library on tropical sanitation: *The Principles of Hygiene as Applied to Tropical and Subtropical Climates*, by W. J. R. Simpson (London: Bale, Sons and Danielsson, 1908); *The Maintenance of Health in the Tropics* (London: Bale, Sons and Danielsson, 1905); *The Maintenance of Health in Tropical Campaigns*, by Duncan (J. and A. Churchill); *Sewage Disposal in the Tropics*, by Major Clemesha, I.M.S. (Calcutta: Thacker, Spink and Co., and London: E. and F. N. Spon, Limited, 1912); *The Bacteriology of Surface Waters in the Tropics* (Calcutta: Thacker, Spink and Co., and London: E. and F. N. Spon, Limited, 1910); *Aids to Tropical Hygiene*, by Major R. J. Blackham (Baillière, Tindall and Cox, 1912); *A Treatise on Hygiene and Public Health*, by Bh. Ghosh and J. L. Das (Calcutta: Hilton and Co., 1912). In addition to these, Castellani and Chalmers's *Manual of Tropical Medicine* will be found useful, as well also as entomological books dealing with mosquitos, tsetse flies, and other biting insects. As far as the writer is aware, there is no book dealing with sanitary engineering and law as applied to the tropics.

THE WASSERMANN REACTION.

OMEGA.—Wassermann's complement deviation test for syphilis is carried out as follows:

1. Reagents. A. Constants: Antigen, antibody, amboceptor, complement, and blood corpuscles. B. Variable: The serum of the patient.

*Antigen.*—Wassermann prefers the liver or spleen of a congenitally syphilitic fetus. The organ is cut into very small pieces, and to every 100 grams of organ is added 400 c.cm. of 0.85 per cent. common salt solution containing 0.5 per cent. carbolic acid. The mixture should be shaken mechanically for twenty-four hours in a dark bottle. The suspension is then centrifugalized, and the brownish, opalescent fluid is decanted and used as antigen.

*Antibody.*—It is advisable to have a typical syphilitic serum which has been inactivized for control.

*Amboceptor.*—Sheep's blood should be diluted with saline fluid, to which sodium citrate is added, and centrifugalized. The supernatant fluid is then poured off, and the process repeated once or twice with sterile physiological saline fluid, and, lastly, the volume of the suspension should be made equal to the original volume of blood with saline fluid. At intervals of four or five days increasing doses of this suspension should be injected intraperitoneally into rabbits, the doses being 2, 4, 8, and 12 c.cm. Nine or ten days after the last injection the rabbit should be bled and the serum tested. The serum must be inactivized by heating to 56° C. for one hour. The unit is determined by ascertaining the smallest quantity which will yield complete haemolysis when 0.05 c.cm. of a 1 in 10 dilution of fresh guinea-pig's serum and 1 c.cm. of a 5 per cent. suspension of sheep's washed blood cells are used.

*Complement.*—Fresh guinea-pig's serum is used. The serum is separated from the coagulated blood, either rapidly by means of the centrifuge or slowly on standing. Complement must always be fresh.

*Blood Corpuscles.*—The suspension is prepared as described under amboceptor, a dilution being made from stock to represent 5 per cent. of the original bulk. The corpuscles should not be older than three or four days, and should be kept on ice.

*The Test.*—A large number of narrow test tubes should be carefully cleaned and placed in a convenient rack; 0.2 and 0.1 c.cm. of the patient's serum heated to 56° C. is mixed with 0.2 and 0.1 c.cm. respectively of antigen, and to each tube is added 1 c.cm. of a 1 in 10 dilution of complement. The same proportions are used, substituting the patient's serum by the standard syphilitic serum and also by normal non-syphilitic serum, both, of course, inactivized at 56° C. These tubes are filled up to 3 c.cm. with saline fluid, well shaken and incubated at 37° C. for one hour. A series of further controls must be put up, in which the remaining serum, the antigen, or the complement are left out and salt solution substituted. One further tube should contain no reagents save saline solution. To each tube after incubation 1 c.cm. of suspended blood cells is then added, and to all, save the tube containing only complement, 1 c.cm. of a 1 in 1,000 dilution of amboceptor (or twice the "unit") is added. All the tubes save one will have the volume of 5 c.cm., and this last named must also be made up to this quantity. The tubes are then well mixed and incubated for two hours at 37° C. They are then taken out of the incubator and placed in the ice chest over night. In the morning the results are read off. The degree of haemolysis in the tubes containing all five reagents will determine the nature of the serum, but complete haemolysis must be present in those control tubes in which the complement, amboceptor, and cells, and either normal serum and antigen, or antigen alone or syphilitic or patient's serum alone, are contained, while inhibition must be present when the test syphilitic serum and the other four reagents are used.

A large number of excellent descriptions of this test has been published, and we would refer "Omega" especially to the account given by Browning and Ivy McKenzie in their *Recent Methods in the Diagnosis and Treatment of Syphilis*, to Noguchi's *Serum Diagnosis of Syphilis*, to Dr. Mott's Morison Lectures (BRITISH MEDICAL JOURNAL, February 20th, 1909, p. 459), and Drs. Flashman and Butler's article on "Complement Fixation" (BRITISH MEDICAL JOURNAL, October 9th, 1909, pp. 1019-1025) *inter alia*. In spite of all these descriptions, however, there are numerous difficulties which have to be met, and which have led to the introduction of a large number of modifications. One of the chief difficulties of the test is the variability of the complement content of guinea-pig's serum, which is supposed to be a constant. If "Omega" intends to make practical application of the test, it would perhaps be worth his while to arrange to see a demonstration of the test at some well-equipped laboratory. Upon this point further advice could if desired be given.

## LETTERS, NOTES, ETC.

LYSOL IN PHTHISIS.

DR. J. W. LANE (Weymouth) writes to suggest the use of lysol (pure) in the treatment of phthisis. He used it at first by vapour spray inhalations, but now prefers to inject subcutaneously a drachm of a 3 per cent. solution in distilled water, increasing by 1 per cent. daily up to 15 per cent.

REFLEX STIMULATION OF THE VAGUS CENTRE IN SEA-SICKNESS.

DR. A. T. BRAND (Driffield) writes: I have elsewhere (*Lancet*, June 29th, 1912, *Caledonian Medical Journal* for October) drawn attention to the value of reflex stimulation of the vagus centre and its vicinity by vesication of the skin over the course of the par vagum in the neck, immediately behind and below the angle of the lower jaw, quoting cases illustrative of the beneficial effect of this treatment in cardiac, respiratory, and gastric affections. There is one most distressing form of nausea and sickness, however, which I have had no opportunity of treating in this way—namely, that incidental to travel by sea; and as it is reasonable to expect that this condition also would be benefited by reflexly influencing the vomiting centre, my object in making this communication is to urge those medical men who "go down to the sea in ships" to take advantage of their ample opportunities to test this method of treatment upon the victims of *mal de mer* who come under their care.


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